



United States Department of Agriculture



Forest Service

Robbers Creek Watershed Restoration Project

Environmental Assessment

Almanor Ranger District, Lassen National Forest, Plumas County, California
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Swain Meadow

Photo by: David Immecker

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Introduction

Lassen National Forest is proposing to complete management activities within the Robbers Creek Watershed to promote healthy, diverse, fire-resilient forests and restore meadow and aspen habitat form and function on 4,744 acres. In addition, this project would address the existing transportation system and hazardous fuels along a Pacific Gas and Electric Transmission powerline. These actions are proposed to be implemented on the Almanor Ranger District of the Lassen National Forest (LNF). This Environmental Assessment (EA) has been prepared to determine whether implementation of these forest management activities may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section of this document.

Proposed Project Location

The project area is located within the Swain Management Area on the Almanor Ranger District. The project encompasses approximately 10 miles of Robbers Creek within the Upper North Fork Feather River Watershed. The southern extent of the project boundary is located approximately 2.5 miles north of Westwood, CA on Lassen County road A-21 and extends north to Barnes Flat (see Appendix A maps 1 and 2 of 4). The project is primarily within Lassen County with a small portion in Plumas County. The project area would encompass all or portions of Township 30 North, Range 8 East, Sections 7, 9, 15, 16, 17, 18, 22, 26, 27, 34, and 35; Township 29 North, Range 8 East, Sections 1, 2, 12, and 13; and Township 29 North, Range 9 East, Sections 6, 7, 18, 19, and 20 Mount Diablo Base Meridian (MDBM) (Figure 1).

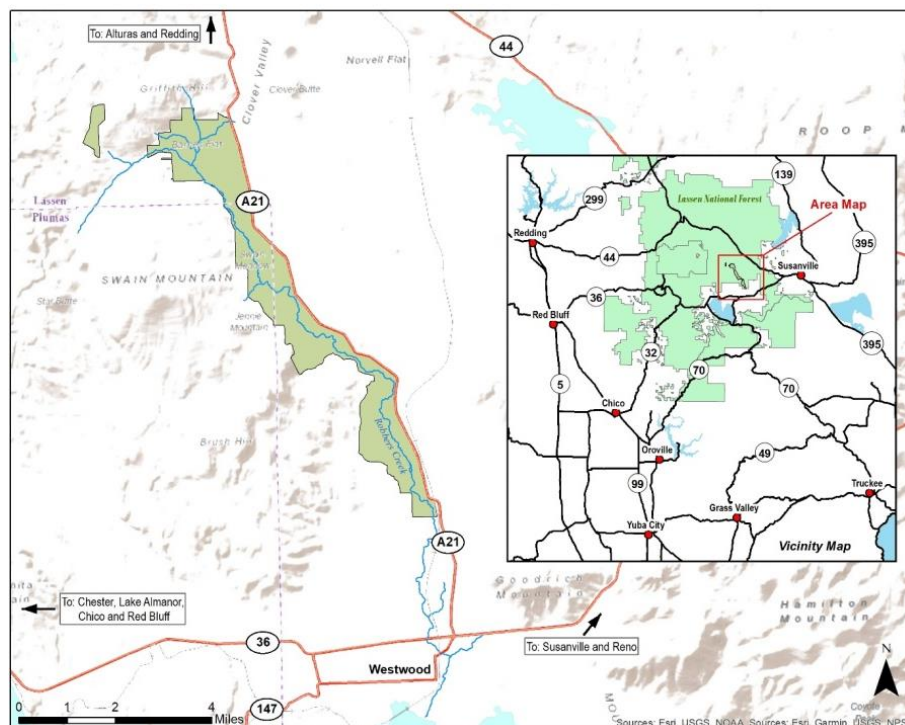


Figure 1: Robber's Creek Project area overview map

Need for the Proposal

The Robber's Creek Project is being developed as a pilot public-private partnership to increase the pace, scale and efficacy of watershed restoration in the Sierra Nevada. The Almanor Ranger District is collaborating with the South Lassen Watershed Group, through a California Climate Investment grant from the California Department of Forestry and Fire Protection (CALFIRE), to develop this project. The purpose and need and proposed actions presented here were developed by the Lassen National Forest in collaboration with The Sierra Institute for Community and Environment, Point Blue Conservation Science, and Forest Creek Restoration. Multiple field trips, workshops, and meetings were convened with this team to evaluate the need and develop project objectives.

The Robbers Creek Project objectives are to restore watershed health to improve the ecological resilience of aspen, meadow, stream and forest habitats. These objectives are designed to be consistent with the 1992 Lassen National Forest Land and Resource Management Plan (LRMP) and 1993 Record of Decision (ROD) as amended by the Sierra Nevada Forest Plan Amendment (SNFPA) Final Environmental Impact Statement and ROD (2004), and the Management Indicator Species Amendment (2007) and aligned with the goals from the Region 5 Ecological Restoration Leadership Intent (USDA 2011).

The Lassen LRMP also addresses the need to support local rural communities by providing a wood supply for local industry and sustaining a part of the employment base in rural communities (LRMP p. 4- 2, 2004, 2004 SNFPA ROD p. 9, USDA 2011). Where consistent with desired conditions, treatments proposed for the Robbers Creek project would be designed to be economically efficient and meet multiple objectives (SNFPA ROD p. 35, 48). This project has five purposes: (1) Improve the health and resiliency across the landscape of upland conifer forest, riparian, aspen and meadow communities; (2) Reintroduce fire into a fire-adapted ecosystem; (3) Restore the hydrologic function of Swain meadow; (4) Provide an efficient transportation system that meets resource management needs while reducing adverse ecological impacts associated with roads; and (5) Reduce hazardous fuels along PG&E transmission powerline.

Purpose and Need 1: Improve Health and Resiliency across the Landscape within Upland Conifer Forest, Riparian, Aspen and Meadow Communities

The degraded communities within the project area are highly unlikely to self-correct to achieve the desired conditions. Thus, intervention to promote the desired conditions is necessary. There is a need to improve forest stand heterogeneity at the local and landscape scale in the project area to allow the forest communities to better cope with drought, wildfire, insects, and disease outbreaks, and to enhance habitat quality. Based on the existing conditions, there is a need to reduce conifer densities to enhance growing conditions for shade intolerant hardwoods and restore associated understory vegetation in each community and protect aspen and meadow hardwood regeneration from browse. There is also a need to recruit more large wood into Robber's Creek to reverse channel degradation and improve in-stream habitat conditions (see Appendix A maps 1 and 2).

Purpose and Need 2: Reintroduce Fire into A Fire-Adapted Ecosystem

Based on the current stand structure and predicted fire behavior, there is a need to reduce surface, ladder, and canopy fuels to reduce the size, intensity, and severity of future wildland fires across the project area. Recognizing that fire was a key landscape process that shaped forest patterns at stand and landscape scales, there is a need to re-introduce fire as a process. Utilizing underburning on the landscape would reduce surface fuels, and help restore and maintain ecosystem structure, composition, and function (see Appendix A maps 1 and 2).

Purpose and Need 3: Restore the Hydrologic Function of Swain Meadow

Without action, Swain meadow will continue to degrade, reducing the ecological services it can provide. There is a need to implement restoration treatments to improve hydrologic function and meadow habitat conditions. Riffles need to be reconstructed to reconnect the oversized channels with the floodplain, raise ground water levels, improve in-stream habitat, reduce sedimentation in the stream, and to reactivate the floodplain during moderate flow events. Restoring floodplain function and water table elevation will in turn promote Willow Flycatcher and other wildlife habitat, increase net soil carbon sequestration, reduce erosion, attenuate flood flows, and increase the duration of flows during the dry season, increasing aquatic habitat refugia (see Appendix A map 1).

Purpose and Need 4. Provide an Efficient Transportation System That Meets Resource Management Needs While Reducing Adverse Ecological Impacts Associated With Roads

Roads play a vital role in providing access for resource management, wildland fire suppression, and public use. There is a need to minimize and begin to reverse adverse ecological impacts from roads and to comply with the LNF Motorized Travel Management ROD, 2010. In addition, there is a need to determine and provide for the minimum sustainable forest transportation system that best serves the current and anticipated management objectives; provides for safe public access and travel; and, contributes to economical and efficient management of the road system. A review of the current transportation system shows (see Appendix A map 3 and 4):

1. There is a need to improve existing roads to minimize and reverse impacts.
2. There is a need to add some non-system routes to the National Forest System for long-term future management and public use;
3. There is a need to decommission system and non-system roads not needed for future management activities to meet resource objectives, to comply with the LNF Travel Management ROD (2010), and to address adverse effects to the watershed;
4. There is a need for temporary roads to meet project objectives.

Purpose and Need 5: Reduce Hazardous Fuels Along PG&E Transmission Line

Approximately 2.7 miles of a Pacific Gas and Electric Company transmission powerline run through the Robbers Creek Project Area. There is a need to reduce forest densities and hazard trees adjacent to power lines to reduce the risk of unplanned ignitions and power outages for Westwood and surrounding communities (see Appendix A map 2).

Decision to be Made

The Forest Supervisor will decide whether to implement Alternative 1, the Proposed Action, as proposed here, as modified to address any unresolved issues, or to continue with Alternative 2, the No Action Alternative.

Public Involvement, Agencies and Tribes Consulted

The Almanor Ranger District collaborated with the South Lassen Watershed Group, through a California Climate Investment grant from the California Department of Forestry and Fire Protection (CALFIRE), to develop this project. The purpose and need and proposed actions presented here were developed by the Lassen National Forest in collaboration with The Sierra Institute for Community and Environment, Point Blue Conservation Science, and Forest Creek Restoration. Multiple field trips, workshops, and meetings were convened with this team to evaluate the need and develop project objectives.

In addition to the collaborative effort described above the Forest Service consulted relevant and concerned individuals, Federal, State, tribal, and local agencies during the development of this EA.

A public field tour was held on October 15, 2019. The field tour was advertised on social media (the Facebook and Twitter accounts for the Lassen National Forest) on October 10, 2019 and published in the October 9, 2019 Feather River Publishing newspapers: Lassen County Times and Chester Progressive. The project proposal was presented and discussed while visiting various locations within the project area. Forest Service staff and the following partners and members of the public attended the field tour.

Conversations with the US Fish and Wildlife Service (USFWS) was conducted for Threatened and Endangered botanical and wildlife species on the following occasions:

- Consultation with Richard Kuyper (Chief, Sierra Cascades Division, USFWS) on September 19, 2019
- Consultation with Richard Kuyper (USFWS), and Stephanie Eyes (USFWS) on October 19, 2019

Scoping for this project was initiated on September 30, 2019. Individuals and groups that expressed interest in response to the Lassen National Forest schedule of proposed actions, newspaper or social media posts were mailed a copy of the scoping document for this project. In addition, individuals, special interest groups or companies and adjacent landowners from the area were also sent the scoping documents (see list below). The scoping documents were made available on the LNF website and posted as a public notice on the Plumas County News website. One scoping letter was received and reviewed by district staff. No issues were raised that required modifying the proposed action.

A scoping letter was sent to the following interested parties within the general public on September 30, 2019:

- **Ben Solvensky cc: Vivian Parker, Sierra Forest Legacy**
1721 Country Club Drive ,Placerville, CA 95667,
- **Chad Hansen, Sierra Forest Legacy**
P.O. Box 244 Garden Valley, CA95633
- **Patricia Puterbaugh, Lassen Forest Preservation Group**
pmputerbaugh@yahoo.com
- **Wally Roney, Roney Land and Cattle Co.**
515 Roney Trail Chico, California 95973
- **Denny Land & Cattle Company, LLC**
P.O. Box 8786 Red Bluff, CA 96080
- **Scott Stawiarski, AFRC**
464-600 Quail Lane, Janesville, CA 96114
- **Lassen County Board of Supervisors**
221 South Roop St. Susanville, CA 96130
- **Ryan Hillburn , Beatty & Associates**
PO Box 1714Susanville, CA 96130
- **Steve Buckley, Lassen Volcanic National Park**
38050 Highway 36 East Mineral, CA 96063
- **Greg Suba, California Native Plant Society**
2707 K Street, Suite 1Sacramento, CA 95816-5130
- **Woody Elliott, CNPS Mount Lassen Chapter**
PO Box4067Chico, CA 95927-4067
- **Debra Hallis, Central Valley Water Quality Board**
415 Knollcrest Dr. Redding, CA96002
- **Kelly Fredrickson cc: Paul Moreno, Pacific Gas and Electric Company**
350 Salem Street Chico, CA 95928
- **Fruit Growers Supply Company**
37073 Highway 299 East Burney, CA 96013-4320
- **South Lassen Watershed Group ---Sierra Institute ---**
PO Box 11, 4438 Main Street Taylorsville, CA 95983
- **Sherrie Thrall, Supervisor, District 3County of Plumas**
P.O. Box 368Chester, CA 96020
- **California Department of Transportation, District 2North Region**
1031 Butte Street, MS 35Redding, CA 96001
- **Martin Ritchie, Research Forester**
3644 Avtech Parkway Redding, CA United States 96002-9241

A scoping letter was sent to interested tribal parties on September 30, 2019:

- **Susanville Indian Rancheria: Honorable Deana Bovee (Chairwoman), cc: Dr. Roselynn Lwenya (Natural Resources Director), cc.Melany Johnson (THPO), cc. Sarah Hubert (Environmental Coordinator)**

745 Joaquin Street, Susanville, CA 96130530 257-6264

- **Greenville Rancheria: Honorable Kyle Self (Chairman), cc: Crystal Rios (Tribal Vice Chairwoman), cc: Lacy Miles (NAGPRA Coordinator)**
P.O. Box 279, Greenville, CA 95947
- **Maidu Summit Consortium & Conservancy: Honorable Ben Cunningham (Chairman)**
P.O. Box 682 Chester, CA 96020
- **Pit River Tribe: Natalie Forest-Perez, cc: Agnes Gonzalez, cc: Anthony Quinn, cc: Marissa Fierro, cc: Charles White; cc: Orvie Danzuka; cc: Brandy McDaniels**
36970 Park Avenue, Burney, CA 96013
- **Redding Rancheria: Jack Potter Jr., cc: Melodie Honey**
2000 Redding Rancheria Road, Redding, CA 96001
- **Michon R. Eben; cc. Thaddeus Cason, Maidu Cultural Preservation Association**

The Draft Environmental Assessment was completed and mailed on January 6, 2021 to the individuals and groups originally scoped, to the Tribes listed above and a legal notice was published on the Plumas News website on January 6, 2021 and closed on February 4, 2021. A total of five comment letters were received during the public opportunity to comment period. All comments were reviewed and thoroughly considered. These correspondences included requests for clarification and comments on operational considerations, integrated design features, transportation system considerations, trail systems and air strip restoration. An analysis of scoping comments is in the project record and summarized in Appendix D. No issues or new alternatives were identified during the analysis of public comments.

This project is subject to the objection process, pursuant to 36 CFR 218, Subparts A and B. Objections will only be accepted from those who submitted project specific written comments during the designated scoping or comment periods (36 CFR 218.5). Individuals and organizations wishing to be eligible to object must meet the information requirements of 36 CFR 218.25, including specific written comments as defined in 218.2 regarding the proposed project, along with supporting reasons (218.25 (a)(3)(iii)).

Proposed Action and Alternatives

The Proposed Action and one alternative, the No Action Alternative, were considered during this assessment. Each alternative is described below.

Proposed Action

The following list of proposed actions is based on extensive field review of the Robbers project area which began in 2009. This list may be expanded or modified based on public collaboration. The Proposed Action was designed to meet the five Purpose and Need statements discussed above. Treatments include mechanical thinning, hand thinning, prescribed burning, machine and hand piling, mastication, meadow hydrologic restoration, construction of temporary roads, repair and maintenance of system roads, and decommissioning of National Forest System roads and non-system roads. In addition to project specific proposed actions described below, the District would implement integrated design features (Appendix B). IDFs are intended to minimize potential for adverse resource effects. Table 1 and Table 2 list the treatment type and acres for the proposed management activities and Table 3 summarizes the proposed road activities.

Table 1. Purpose and need 1, 2 and 5 - vegetation treatment types in the Robbers Creek project area

| Treatment Type | Acres |
|--|--------------|
| Upland Forests (A) | 2,545 |
| Mechanical thin (follow up machine pile/chip and haul, pile burn or underburn) | 2,048 |
| Mechanical thin Meadow Ecotone (follow up machine pile/chip and haul, pile burn or underburn) | 206 |
| Hand thin only (follow up hand pile, pile burn and underburn) | 16 |
| Northern Goshawk Protected Activity Center (PAC) - hand thin, hand pile, pile burn and underburn | 275 |
| Aspen and Riparian Hardwoods (B) | 630 |
| Aspen Mechanical thin (follow up hand thin, hand pile, pile burn and underburn) | 613 |
| Riparian Hardwood Mechanical thin (follow up hand thin, hand pile, pile burn and underburn) | 16 |
| Hand thin only (follow up hand pile, pile burn and underburn) | 1 |
| Meadows (C) | 424 |
| Mechanical thin (follow up hand thin, hand pile burn, pile burn and underburn) | 383 |
| Hand thin only (follow up hand pile, pile burn and underburn) | 41 |
| Reintroduce Fire (D) | 973 |
| Underburn only | 926 |
| Underburn only in northern goshawk PACs | 47 |
| Total | 4,745 |

Note: Acres may vary slightly during the final layout due to topography, stand condition, and rounding, etc.

Table 2. Purpose and need 4 - Swain Meadow hydrologic function improvement

| Actions | Approximate Acres/Miles |
|--|--------------------------------|
| Meadow Hydrologic restoration | 174 ac |
| Riffle Augmentation | 2.7 miles |
| Beaver Dam Analog | 20 locations |
| Borrow Areas | 2 sites |
| Lowering and Aggrading Roads and Ditches | 0.22 miles |

Table 3. Summary of road actions proposed in the Robbers Creek project area

| Proposed Action | Miles |
|---|--------------|
| Add non-system route to National Forest System (NFS) Maintenance Level (ML)1 (administrative use, closed to the public) | 0.17 |
| Add non-system route to NFS ML2 (public use for high clearance vehicles) | 0.26 |
| New road construction, add to NFS ML1 | 0.30 |
| Decommission NFS ML2 roads | 0.48 |
| Decommission non-system routes | 11 |
| NFS ML2 Road reconstruction | 1.06 |
| New temporary road construction | 7.0 |

Improve Forest Health and Resiliency Across the Landscape

Vegetation Treatments

Improve stand structure and species diversity of mixed conifer and east side pine forests to reflect a more fire adapted and resilient ecosystem. Treatment would include thinning (mechanical and hand), piling activity created and surface fuels (machine and hand), and prescribed fire (pile and underburning) (see Appendix A maps 1 and 2).

Upland Forest

Concepts from the Pacific Southwest Region General Technical Reports (GTR), An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests (North 2009, GTR 220) and Managing Sierra Nevada Forests (North 2012, GTR 237) would be applied to meet the desired conditions for the project area. Trees would be thinned using a modified thin from below prescription to vary density throughout a treatment unit. Trees would be retained in groups separated by moderately treed or open gap conditions to create a mosaic stand structure. Variable density thinning would encourage horizontal and vertical structural diversity.

In areas proposed for mechanical treatment, ground-based equipment would be utilized on slopes up to 35 percent to harvest merchantable trees less than 30 inches diameter at breast height (DBH). Unit 144 would be an exception and mechanical harvesting would be allowed on slopes up to 45 percent (see Appendix A map 2 of 4 and Appendix B, IDF #68). Whole-tree yarding would be used when possible. Hand treatments would occur within these units in areas where equipment cannot be used such as in rocky or steep slopes and streamside areas. Follow up hand treatment or mastication would also occur post-mechanical treatment to cut non-merchantable trees. Hand treatments include felling trees less than 30 inches DBH, lopping and scattering or piling and later burning. Activity generated landing slash would be machine piled and burned or chipped and hauled to a biomass facility. Units proposed for hand thin treatment only are found in areas which have slopes greater than 35 percent or are within sensitive riparian areas. Hand treatment would focus on removing trees that are ladder fuels to larger trees. Trees generally up to 12 inches DBH would be thinned, piled and piles burned.

Within treatment areas, trees 30 inches DBH and larger would be retained within the limits of safety and operability. Any of these larger trees that are felled for safety and operability would be left on site for

wildlife and other resource considerations. Trees 30 inches DBH and larger that are cut for establishment of new roads would be removed and not left on site. All snags would be retained within the limits of safety and operability.

Trees that are suppressed, of considerably poor health, or appreciably diseased would be removed in favor of retaining healthy trees, unless otherwise retained for wildlife value. Healthy, shade-intolerant pine (ponderosa, sugar, and Jeffrey) and Douglas-fir would be favorably retained over shade-tolerant white fir trees and fire-intolerant lodgepole pine.

Variable density thinning (VDT) is a compilation of various thinning treatment components including a) dense clumps of trees, b) canopy openings where few or no trees exist, c) the matrix – areas between clumps and openings with varying tree densities. A percentage of smaller trees would be left for structural diversity. Residual tree density within the matrix and the placement of clumps and openings would be influenced but not dictated by topography such as slope, slope position, and aspect in addition to microsites (unique topographic features). Variable density thinning would promote heterogeneity within stands and across the landscape by increasing vertical and horizontal diversity (a mixture of clumps, openings, and matrix) that provides a variety of wildlife habitat elements, while creating a fire-resilient stand (reduction in canopy continuity, surface and ladder fuels). Canopy cover and basal area would be highly variable across treatment units but would follow the Standards and Guidelines in the Forest Plan, as amended by the 2004 Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD, USDA 2004). Wildlife structural diversity patches would be captured in the clumps and openings as part of the variable density thinning design prescription. Table 4 lists the design criteria for the mechanical thinning treatments based on the California Wildlife Habitat Relationships (CWHR) type.

Piling operations would occur where predicted surface fire behavior exceeds desired conditions. Generally, down woody surface fuels 3 inches in diameter or less would be less than 5 tons per acre. Surface fuels 3 inches in diameter and larger would be reduced to 15 tons per acre. Surface fuel 12 inches in diameter and larger would be favorably retained over smaller material. Activity-generated and existing surface fuels would be piled using a machine with a grapple style attachment or a dozer fitted with a brush rake.

Table 4. Design criteria for mechanical thinning actions in upland forest

| Criterion | Design |
|---------------------|---|
| Mechanical Thinning | Mixed conifer CWHR types* 4M, 4D, 5M, 5D, and 6 <ul style="list-style-type: none"> • Retain 40% of existing Basal Area. • Retain 40-50% canopy cover • Avoid reducing canopy cover by more than 30% • Post-treatment densities would range 120 to 160 square feet of basal area per acre. |
| | East-side Pine CWHR types 4M, 4D, 5M, 5D, and 6 <ul style="list-style-type: none"> • Retain 30% of existing Basal Area • Post-treatment densities would range 60 to 100 square feet of basal area per acre. |

| Criterion | Design |
|---|--|
| VDT Clumps (dense groups of trees) | <p>Clumps range in size from 5 to 10 trees up to 1/4 of an acre.</p> <ul style="list-style-type: none"> • Cover up to 15% of each proposed treatment unit. • Comprised of intermediate to large dominant, codominant trees, preferably shade-intolerant conifers depending on species composition. • Generally higher basal area and canopy cover than stand “average.” • It is appropriate for trees to have interlocking crowns. • Incorporate wildlife habitat trees (e.g. those with forks, crooks, existing cavities, brooms, nests and snags). • Ladder fuels removed to reduce potential torching. • Desired residual canopy cover >50%. • Retain clumps in irregular shapes. |
| VDT Openings | <p>Openings vary in size from 3 to 5 trees up to 1/4 of an acre.</p> <ul style="list-style-type: none"> • Cover up to 15% of each proposed treatment unit. • Expand/enhance existing openings dominated by desired conifer regeneration. • Create around or adjacent to dominant/codominant shade- intolerant conifers, desired seed sources, legacy trees or clumps of these trees (trees generally >24” DBH) • Establish where existing structure is generally uniform and lacks structural diversity. • Utilize shrub species as anchor points for creation of openings. • Create openings with irregular shapes. |
| VDT Matrix Thinning (areas between clumps and openings) | <p>Variable tree spacing and densities.</p> <ul style="list-style-type: none"> • Healthy, fire resistant shade-intolerant conifers (pine species, Douglas-fir) within all size class would be preferentially retained along with scattered shade-tolerant trees. • Thinning would occur through all size classes <30 in DBH, but would focus on removing suppressed and, intermediate trees, and trees of poor health and vigor. • Canopy cover would range from 30-60% (depending on existing conditions), averaging approximately 40-50% across the treatment unit. • Increased tree removal around fire-resistant legacy trees (generally >24 in DBH) to provide protection from torching. • Release of hardwood species, shrub species and understory vegetation. |
| Follow-up Treatments | <p>Grapple piling, mastication, hand thinning, hand piling and/or underburning may follow initial treatment if needed to meet project objectives.</p> |
| Down Woody Material Retention | <p>Emphasize retention of wood in the largest size classes and in decay classes 1, 2, and 3</p> |

| Criterion | Design |
|---|--------|
| CWHR: 4=average tree size small (11-23.9 inches DBH); 5=average tree size medium to large (24.0 inches DBH and larger); 6=multi layered size 5 over size 4 or 3 (pole size trees 6-10.9 inches DBH); M=canopy cover 40-59 percent class; D=canopy cover 60-100 percent class. | |

Aspen and Riparian Hardwoods

There are approximately 21 aspen stands within the Robbers Creek Project area. To enhance the growing conditions and increase sunlight for aspen and other riparian hardwoods, competing and overtopping conifer trees would be removed. Treatment would include hand thinning, hand piling, dry season mechanical treatment and over-snow mechanical treatment. Aspen treatments would occur within 200 ft. of delineated aspen stands to allow more sunlight to reach stands and allow for stand expansion. A total of 614 acres of aspen would be treated with an additional 16 treated acres of other riparian hardwoods (cottonwood, willow).

Some conifers would be retained in aspen and riparian hardwood areas at densities between 20-60 square feet of basal area. Conifers would be retained using the following indicators: fire tolerant species, presence of fire scars, and proximity to old stumps/snags/or logs, where they do not impede the growth of aspen or riparian hardwoods and would provide future coarse woody debris input to streams. The largest conifers would be preferentially selected for retention and where they occur in clumps or groups. All snags would be retained within these areas, within the limits of safety and operability.

Where aspen and riparian hardwood treatments occur along Robbers Creek, conifers would be retained to contribute to the long-term recruitment of large wood. Large wood in the stream contributes to the geomorphic function and dynamism of Robbers Creek. Between 5 to 10 percent canopy cover of conifers would be retained where they may contribute to the long-term recruitment of wood in the stream. In addition, some conifers would be hand felled strategically to increase large wood in the stream. Directional placement of trees would occur in reaches deemed deficient in coarse woody debris or where placement of wood would enhance stream bed and bank stability as identified and directed by a watershed or aquatics specialist.

Temporary livestock or wildlife fences would be constructed around aspen stands to protect new shoots that are being heavily browsed until they grow above the browse line (e.g. 5 feet for livestock and 6 feet for wildlife). These fences would be utilized to either deter or exclude livestock or wildlife so that new aspen shoots can establish and recruit into larger size classes. Exact locations would be identified post implementation after utilization has been determined in each stand.

After mechanical and hand thinning treatments have been completed, prescribed fire would be allowed to back into aspen stands during prescribed burning operations in adjacent uplands. Any fences installed prior to underburning activities would be protected.

Meadow

Approximately 597 acres of meadow habitat have been identified in the Robbers Creek project area. To increase the extent of these meadows and improve their overall function, encroaching conifers would be removed via a combination of hand thinning, hand piling and burn, lop and scatter, dry season mechanical treatment, over snow mechanical treatment, and/or prescribed fire. Integrated design features would minimize disturbance to soils and reduce rutting or other damage to the meadow area during implementation (see Integrated Design Features in Appendix B).

The recoverable extent of the meadow footprint was determined during field visits and meadow boundaries were defined using a global positioning system (GPS) receiver. In addition, meadow assessments were

completed using the Meadow Condition Scorecard (American Rivers 2012). The meadow footprints were identified using both topographic indicators of a slope break and the presence or absence of wetland associated plant species. Conifer removal would occur throughout the delineated recoverable meadow area.

Some conifers would be retained to promote geomorphic function and dynamism of streams within the meadow areas. Between 5 to 10 percent canopy cover of conifers would be retained where they may contribute to the long-term recruitment of wood. Conifers that meet the following criteria would be preferentially retained: located where they would fall into the stream, have fire scars, are near old stumps/snags/or logs, are not shading riparian hardwoods, and the largest trees in the area. Snags would also be retained within the meadow area, within the limits of safety and operability.

Dry season mechanical tree removal would occur within the meadow area where soils are dry to 10 inches. Over-snow mechanical tree removal would only occur when snow conditions and depth are sufficient to protect soils from compaction. Conifers less than 30 inches DBH would be removed throughout the meadow area. Where mechanical treatment is not feasible due to soil conditions, hand thinning conifers would be applied. Boles greater than 10 inches DBH would be felled and left within the meadow as large down woody debris. Boles less than 10 inches DBH would be bucked, hand carried, and hand piled outside the wet meadow area (with the exception of meadow unit 504, where piles may be burned in areas of the wet meadow, see inset Appendix A map 1 of 4). Piled material resulting from the conifer removal, would be burned.

Directional placement of trees would occur in reaches deemed deficient in coarse woody debris or where placement of wood would enhance stream bed and bank stability as identified and directed by a watershed or aquatics specialist.

Underburning (excluding units 520 and 501 see Appendix A map 1 of 4), and hand thinning and lopping within meadows would be considered as a secondary treatment to reduce conifer regeneration, promote herbaceous vegetation, and reduce fuels. Underburning or hand treatments in meadows would occur as a maintenance strategy to control future conifer regeneration. Underburning would take place after mechanical and hand treatments and timed to allow for the break-down of project generated fuels. Underburning would occur in the fall, when meadow grasses are dry enough to allow for fire to carry. Meadow units may be temporarily rested from livestock grazing to meet vegetation management goals that would enable prescribed burning. Meadow monitoring would be conducted annually to determine if resting each meadow to reach optimum levels of vegetation for burning conditions and/or recovery is needed. If resting a meadow is warranted, fences would be used to temporarily exclude livestock to allow for desired meadow vegetation conditions. Livestock could be excluded for a period anticipated to be at least one growing season prior and two growing seasons following burning.

Fences, large boulders or other structures would be strategically placed in some areas to protect meadows and vernal pools from damage caused by unauthorized motor vehicles. The existing 550 ft. fence between Road 30N07 and the Swain vernal pool would be repaired. New fence construction would extend the fence an additional 1250 ft. along Road 30N07. Boulders would be placed to block vehicular access at the southern edge of the pool.

Northern Goshawk Pac Hand Thin Only

Hand thinning would occur on approximately 275 acres of Northern Goshawk Protected Activity Center (PAC). Conifers less than 6 inches in diameter would be hand thinned and piled, existing surface fuels up to 12 inches diameter would also be piled for burning. After piles are burned, underburning would be utilized to meet desired conditions.

Prescribed Fire

Prescribed fire would occur as a stand-alone treatment in some stands (973 acres, including 47 acres of Goshawk PAC) and as a follow-up treatment in others (3,568 acres). After mechanical and hand thinning treatments in upland forests, aspen stands and meadows, underburning would be used to promote snag development and promote shade-intolerant species like ponderosa and Jeffrey pine while reducing species less resilient to fire like white fir and lodgepole pine. Integrated design features address resource protection measures in areas where high intensity fire is undesirable. In these areas direct ignition would be excluded, however fire would be allowed to move into these areas on its own. In areas of the project that currently meet desired ladder and crown fuel conditions, prescribed burning would be a stand-alone treatment to maintain those conditions (see Table 4). The following section describes the specific objectives for underburning in various treatment areas, Table 5 summarizes these objectives (see Appendix A maps 1 and 2).

Table 5. Objectives for underburning

| Post Mechanical Thinning | |
|---------------------------------|--|
| Upland Forest | Promote shade intolerant/fire resilient species recruitment Promote understory vegetation Maintain large wood within stands while reducing surface fuel loading Promote snag development - allow up to 10% mortality of live conifer basal area (square feet per acre) |
| Aspen | Stimulate aspen regeneration Protect roots from high residual heat Protect fencing from fire damage |
| Meadows | Eradicate lodgepole regeneration |
| Post hand thinning | |
| Northern Goshawk PAC | Promote snag development – allow up to 15% mortality of live conifer basal area (square feet per acre) |
| Underburn only | |
| Previously thinned | Promote shade intolerant species reproduction Deter regeneration of shade tolerant species Maintain large wood within stands while reducing surface fuel loading Promote snag development – allow up to 15% mortality of live conifer basal area (square feet per acre) |

Control lines would be constructed for prescribed burn operations, except where existing roads, skid trails, or natural barriers would serve as control lines. Control lines would not be constructed in wet meadows or where meadow vegetation is present. Along control lines existing snags may be dropped where they pose a safety risk or for prescribed burn control.

Underburning is proposed on a total of approximately 2,545 acres as a follow-up treatment in upland forests. Within the mechanical treatment areas, underburning would be used to reduce surface fuels and stimulate and increase density and diversity of understory species. Underburning would promote snag development by allowing for up to 10 percent basal area conifer mortality to occur as a desirable outcome. Less desirable conifers are more prone to fire induced mortality, thus meeting the objective to promote shade intolerant/fire resilient species while also promoting snag development.

Underburning is proposed on a total of approximately 630 acres as a follow-up treatment in aspen and riparian hardwood areas. To prevent excessive aspen mortality and damage to the root system, fire would be allowed to back into aspen and riparian hardwood stands. Active lighting within aspen stands may occur if it is determined that doing so would not cause excessive aspen mortality, compromising the stands ability to recover. Underburning may help to stimulate aspen regeneration, however the best window to promote regeneration is immediately after mechanical thinning. If this cannot be achieved, it is desirable to wait until the majority of the “post mechanical thinning” regeneration is above 5 feet tall.

Underburning is proposed on a total of approximately 394 acres as a follow-up treatment in meadow areas. The main purpose for underburning in meadows is to diminish lodgepole seedling establishment following mechanical thinning. Multiple entry burning after each pulse of seedling growth is expected to moderate lodgepole regeneration and allow the meadow to persist in the long-term with limited encroachment of lodgepole. Burning would occur in the dry season and in years when grazing has not reduced surface fuels so that fire would be able to burn through the meadow. Fire would be of high enough intensity to kill lodgepole seedlings between 1 and 3 feet tall. As an alternative to underburning, hand cutting and lop and scatter of regenerating lodgepole would be used where underburning is unfeasible or where underburning would result in undesirable loss or reduction of riparian hardwoods.

Underburning is proposed on a total of 278 acres as a follow-up treatment in two Northern goshawk PACs (units 141, 159, 426, 427, 536 and 521 see Appendix A maps 1 and 2 of 4). Underburning is proposed as a stand-alone treatment on 47 acres of Northern goshawk PAC, in unit 191 (see Appendix A map 2 of 4). Within the goshawk PACs, underburning would be used to promote snag development and ultimately the long-term development of large logs. Because hand thinning would retain higher stand basal area, it is desirable to allow up to 15 percent basal area (square feet per acre) mortality of the existing live conifers to increase stand complexity and promote habitat for goshawk prey (e.g. small mammals, birds).

Underburning is proposed as a stand-alone treatment on 926 acres. These acres are planned as underburn only due to the existing fuel and forest conditions within the units. The conifer overstory in these units already meets desired conditions as a result of past treatments. Surface fuel loadings are lighter with fewer ladder fuels present than units that are proposed for mechanical treatments or hand thinning. Prescribed fire would be used to maintain surface and ladder fuel conditions, increase snag recruitment, and encourage recruitment of understory species.

Prescribed fire would not be utilized within the Swain meadow restoration area units 501 and 520 to allow for planned revegetation efforts to establish (see Appendix A map 1 of 4).

Restore the Hydrologic Function of Swain Meadow

Riffles reconstruction (hereafter referred to as riffle augmentation) and Beaver Dam Analogs (BDAs) would be used to restore hydrologic function within Swain Meadow. Existing degraded riffles would be rebuilt, and new riffles would be added to multiple large oversized channels and a smaller western channel to reestablish riffles of similar composition prior to degradation. Several BDA's would be constructed in Swain Meadow, primarily downstream of existing beaver dams and where willows are present. Both techniques (riffle augmentation and BDA's) would seek to utilize native materials to reconnect the stream to the floodplain. This approach would restore the physical processes within Swain Meadow responsible for formation of the meadow.

Artificial roads and ditches would be re-contoured to match natural topography to avoid capturing surface and subsurface flows and otherwise altering the natural hydrology of the meadow. Riparian deciduous shrubs (e.g. willow, spirea, dogwood) would be established along existing and remnant stream channels.

Additionally, a wood component would be added to the meadow by falling conifer trees along the meadow margin. Access to the site is available from County Road A21 and Forest Service roads on the western and eastern sides of the meadow.

Information from the Swain Meadow Concept Restoration Design Plan (Forest Creek Restoration, Inc., hereafter referred to as the “Design Report”) was used to develop the proposed action and is hereby incorporated by reference. The Design Report describes the restoration proposal and specific methods in detail. The following sections provide a summary (see Appendix A map 1 of 4, unit 501).

Riffle Augmentation

Within the oversized channels and smaller western channel, riffle augmentation would be used to raise the base elevation of riffles. About 14,500 feet of channel would be treated with approximately 393 riffles. Riffles would be constructed approximately every 25-30 feet along each channel and would have a slope between 0.3% and 1.0%. The placement of the riffles would utilize areas where existing riffles are present and areas of higher base elevation along each channel. Riffle construction would be done by using heavy equipment to place soil/sod mix in riffle areas to set the channel base elevation approximately 0.5’-0.8’ below the top of the bank. A slight concave shape would be developed into the riffle to concentrate flows to the center of the structure. Biodegradable jute fabric would be placed and staked on about 25-75% of reconstructed riffles.

For each riffle, existing sod within the channel would be removed, then alluvium from nearby borrow areas would be transported with heavy equipment and added to each riffle. Sod removed from the channel would then be placed back to reconstruct the riffle. In instances where more sod is needed, sod would be removed from gully reaches and adjacent floodplain areas. Other sensitive resources (e.g. plants) would be avoided when sod from the floodplain is removed. When material is removed from the floodplain, it would be done in patterns similar to geomorphic features (i.e. meander scars).

Beaver Dam Analog

Approximately 20 BDA’s would be built within the existing channel of Robbers Creek, most located in the upper reaches of Swain Meadow and a few located in the lower reach. BDA structures would be built by hand, each consisting of approximately 12-15 posts (about 10 feet long and 4-6 inches in diameter). Posts would be made from conifer trees harvested from the surrounding thinning units 185, 201, 204, 205, 423 and 424. The posts would be driven approximately 3-6 feet deep into the streambed using a hand-held post pounder or a pounder attached to a portable hydraulic powered generator, placed approximately 16-20 inches apart. Once posts are in place, on site willow branches and other native material (e/g/ brush, branches, sod, soil and rock) would be woven and placed between post to protect from scour and reduce water permeability through the structure. The intention of the structures is to either redirect flow to the valley low or remnant channels, or to serve as grade control while passing flow over the structure.

Repairs and Maintenance

Maintenance and repairs to BDAs and or riffles may be required to maximize their effectiveness over a 5 to 10-year period. Repairs and maintenance would be site specific and depend on how water is influencing or changing the meadow surface after initial installation. Repairs to riffles may be triggered where augmentation is needed to promote more floodplain connectivity. Repairs may also be justified where there is any erosion on the crest of riffles. Where beavers have not taken on maintenance of BDAs, some annual maintenance of BDA structures may include adding sod plugs, incorporating more willow or material to ensure their effectiveness. Additional BDAs may be added to capture sediment from erosion features that have started to form or to influence the flow of water over the floodplain.

Borrow Areas

Borrow areas are necessary to acquire material for riffle augmentation. Two borrow areas are potentially available for use at Swain Meadow: 1) appropriate alluvium generated from a nearby road construction project and 2) a lodgepole pine site (unit 190) located 0.5 miles east of Swain Meadow where trees would be removed first, then material would be dug and transported to the riffles. A third borrow site, within the project area, may be needed if unanticipated circumstances result in the unavailability of one of the two preferred sites.

Lowering and Aggrading Roads and Ditches

The road bisecting the meadow would be lowered one foot on average. The material removed from the road would be used as fill nearby as the material appears to be generated from the adjacent floodplain. The artificial channel feature from the road would be treated with intermittent “plugs” to redirect water onto the meadow. Additionally, three linear ditches on the western floodplain margin would be intermittently filled to match adjacent topography and reduce their ability to capture flow and alter meadow hydrology. Adjacent stockpiled material from the construction of the ditch is available to use to refill the ditches.

Planting

A riparian planting plan would be developed to establish willow and other species along the existing and remnant channels. Locally adapted species and species that are likely to be selected for as the climate changes would be chosen. Plugs or transplanted sod containing *Castilleja lasenensis* and host plants such as *Potentilla millefolia* would be planted at appropriate elevations for their survival under the new soil moisture conditions.

Placement of Trees

Small trees (less than 12 inches DBH) would be hand felled across the eastern margin into the meadow, approximately every 100 feet. Trees would be harvested from the surrounding thinning units 185, 201, 204, 205, 423 and 424 (see Appendix A map 1 of 4). Trees would provide a wood component to the meadow that was historically present, to capture debris and sediment and discourage livestock trailing along the meadow margin.

Fencing

Following restoration activities, livestock use would be minimized within the restoration area. A drift fence or other allotment adjustments (i.e. rest rotation or pass through) would be used to control timing, duration, and intensity of grazing to allow for the recovery of the riffle augmentation sites and vegetation regrowth of willows and other meadow vegetation.

Transportation Management

The existing forest transportation system would be utilized to provide access to treatment units. Road maintenance would be performed on a portion of that system as needed for project implementation. Approximately 7 miles of temporary roads may be constructed for access during project implementation. These temporary roads would then be decommissioned upon project completion (see Table 6 and Table 7).

A total of approximately 0.5 miles of existing National Forest System (NFS) road would be decommissioned as they are not needed for long-term future management; approximately 11 miles of non-system routes were determined to have no immediate or long-term future management needs and would be decommissioned. Both the mapped non-system routes as well as any un-mapped non-system routes within the project area would be decommissioned (Table 6 and Table 7).

In addition to the existing forest transportation system, approximately 0.30 miles of ML 1 NFS road would be constructed to access treatment units. These new NFS roads would be designed to be out-sloped where possible with self-maintaining drainage structures. ML 1 roads are closed to all motor-vehicle traffic, but retained on the NFS to facilitate future management activities (see Table 6 and Table 7).

Approximately 0.26 miles of non-system routes were determined to provide access to two dispersed camping locations and would be added as National Forest System (NFS) roads (maintenance level 2) in order to continue allowing public access (see Table 6 and Table 7).

Approximately 1.06 miles of road would need reconstruction. This would include the removal of all trees from within the road prism as well as brushing, blading the road surface, improving drainage and replacing/upgrading culverts where needed (see Table 6 and Table 7).

NFS roads used for haul would receive pre-, during-, and/or post-haul maintenance as per Forest Service Road Maintenance T-Specifications for Timber Sale Contracts. Maintenance items include surface blading, surfacing, clearing for sight distance, installation of rolling dips, and cleaning drainage facilities. The road maintenance on this project would supplement a forest road maintenance program that is currently under-funded. A dust abatement plan would also be included to control wind-caused erosion from road use. A surface replacement deposit collection would be required based on haul volume on any gravel- or cinder-surfaced NFS road.

Table 6. Design criteria for road activities for the Robbers Creek project

| Criterion | Design |
|---------------------------|---|
| Decommission/Obliteration | Decommissioning/Obliteration may involve recontouring subsoiling. removing drainage structures, restoring vegetative cover, blocking access or some combination of these treatments. |
| New Temporary Roads | Temporary roads, new constructed or existing non-system routes, would be used for project work and subsequently restored when the fuels and vegetation management work is complete. |
| Reconstruction | Reconstruction may involve the removal of all trees from within the road prism as well as brushing, blading the road surface, improving drainage and replacing/upgrading culverts where needed. |
| New Temporary Roads | Temporary roads would be constructed for project work and subsequently restored when the fuels and vegetation management work is complete. |

Powerline Thinning

A Pacific Gas and Electric (PG&E) transmission line bisects the southern end of the project area, passing through the following treatment units; U-150, 153, 166, 167, 172, 173, 182, 302 and 303 (see Appendix A map 2 of 4). Within 300 ft of the center line both live and dead fuels would be treated in excess of the surrounding units to reduce the risk of damage to the transmission lines resulting in loss of power or a source of ignition for a wildland fire. Two stand improvement treatments are proposed within this area: Removal of hazardous vegetation within 40 feet of center line and thinning conifers growing within 40 to 300 feet of center line.

Within 40 feet on either side of the center line, all incompatible vegetation would be marked for removal. Incompatible vegetation is that which is undesirable, unsafe, or interferes with the intended use of the site. This includes any vegetation that can grow to a height that encroaches into PG&E's minimum vegetation clearance distances, presents a fire hazard, impedes access or obscures the inspection of equipment. In addition, vegetation would be marked for removal that may pose a hazard to the lines within the next five years from grow-in or fall-in. Additional trees and other vegetation may also be marked for removal if they pose a potential threat to the safety or reliability of the line at any time in the future. Well-spaced, healthy vegetation could be left, based on the professional judgment of the inspector that the vegetation would not be a hazard to the lines in the foreseeable future.

Within the area from 40 to 300 feet of the transmission centerline, trees would be thinned to reduce stand density for forest health and reduce risk of high-severity wildland fire. The specific elements of the proposed thinning within 300 feet of line are as follows;

- Stands would be thinned to a target basal area of 40 to 60 square feet per acre.
- Trees determined to be a hazard to the powerline would be cut regardless of size.
- Ground-based logging equipment would be used to remove commercially viable material sawlogs and biomass and on-commercial trees would be thinned and piled on site;
- In areas inaccessible to ground-based machines, hand thinning may occur;
- All hardwood trees, as well as conifer trees greater than 29.9 inches in diameter at breast height (DBH) would not be cut unless they pose a hazard to the power line;
- Trees would be favored for retention in this order: healthy sugar pine, ponderosa/Jeffrey pine, Douglas-fir, incense-cedar, white fir, lodgepole pine.

Thinning treatments, on their own, may be ineffective at reducing fire hazard in stands with high fuel loads. As a result, surface, ladder, and activity fuels will be treated within 300 ft of the center line using a combination of methods, including pile and burn, mastication, and chipping. Due to the need to reduce surface fuels removal by chipping (and hauling for biomass) is the preferred fuel treatment method, but the others may be used where chip-van access is limited.

No Action Alternative

No Action Alternative is required to provide a benchmark to compare the magnitude of environmental effects of the action alternatives. Under the No Action Alternative, activities proposed to restore ecological health to the Robber's Creek project area would not occur. No fuels reduction or underburning would occur. Landscapes that have been altered by conifer encroachment would persist; therefore, the historic native vegetation community would not have an opportunity to recover and the fire regime would not be restored to historic pre-settlement levels. Hazardous fuels would remain throughout the project area, including along the PG&E transmission line.

Swain meadow would not be restored. Stream conditions would continue to degrade during moderate flow periods. Erosion and sedimentation would likely persist, causing further incision of the stream channel. Hydrologic function would continue to degrade such that depth to ground water would increase, causing loss of instream, floodplain, and wet meadow habitats. Habitat for wildlife, including Willow Flycatcher, aquatic species, and other wildlife species would not be improved.

The current extent and conditions of transportation systems throughout the Robber's Creek project area would remain. National Forest System (NFS) roads, unauthorized routes, and a county road (A-21) would not be improved for stability to comply with the LNF Motorized Travel Management ROD, 2010. The road

in Swain meadow would not be lowered to reduce erosion. No additional routes would be planned or constructed for long-term future management and public use.

Environmental Impacts of the Proposed Action and Alternatives

In order to tie directly to the FONSI, this EA describes the impacts of the proposed action and any alternatives in terms of context (society as a whole, human, national), the affected region, the affected interests, and the locality) and intensity (severity of the impact) as described in the definition of “significantly” at 40 CFR 1508.27. This section summarizes the potential impacts of the proposed action and alternatives for each impacted resource. Although no discussion of effects to recreation resources is required for the project, potential impacts to recreation are addressed in the project IDFs (Appendix B). All analyses prepared in support of this document considered both beneficial and adverse effects, but all effects determinations were made based on only adverse effects. None of the potential adverse effects of the proposed action or alternatives would be significant, even when considered separately from the beneficial effects that occur in conjunction with those adverse effects.

Scope of the Cumulative Effects Analysis Area

The Cumulative Effects Analysis (CEA) area would be, at a minimum, the project area. In addition, some resources use a larger CEA area such as sub-watersheds. The time period used for including past actions is 30 years before present (1989-2019). The cumulative effects analysis in this environmental assessment is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part: (USDA 2008).

“CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making. (40 CFR 1508.7)”

For these reasons, the analysis of past actions in the Robber’s project and specialists’ reports is based on current environmental conditions.

Past, Ongoing, and Reasonably Foreseeable Future Actions

The following list of cumulative effects actions are considered for the Robber’s Creek project. Table 7 summarizes ongoing, and reasonably foreseeable future actions. For a complete list of past, ongoing and reasonably foreseeable future actions refer to Appendix C; Past, Ongoing, and Reasonably Foreseeable Future Actions. Guidance on cumulative effects, particularly past actions, was considered based on Council on Environmental Quality (CEQ) regulations on cumulative effects analysis. Data for this analysis was compiled from district GIS and FACTS databases, district stand record cards, and resource specialists. Data

for Timber Harvest Plans (THPs) and Nonindustrial Timber Management Plans (NTMP) on private lands in the analysis area were acquired from the California Department of Forestry and Fire Protection website (CDFW 2020).

Table 7. Ongoing and Future Actions

| Treatment Type | Timeframe | Description |
|---|------------------|--|
| Transportation | | |
| Road Maintenance | ongoing | Annual road maintenance, grading of roads and ditches, culvert clean out, hazard tree removal |
| Range | | |
| Cattle Grazing | ongoing | Seasonal cattle grazing within allotments |
| Recreation | | |
| General Recreation Use | ongoing | OHV use on forest roads; hunting; dispersed camping; driving for pleasure; sightseeing |
| Tree Cutting | | |
| Wood cutting and Christmas tree cutting | ongoing | Cutting dead trees for firewood. Cutting live tree for Christmas Trees |
| Hazard tree removal | ongoing | PG&E powerline hazard tree removal |
| Private Land Forest Management | future actions | Private timber lands adjacent to but within the sub watersheds surrounding the Robbers Project currently have. |

Watershed

Environmental Consequences

Alternative 1 – Proposed Action

Direct and Indirect Effects

Stream Flow – Upland Forest Treatments, Riparian, Aspen and Meadows

Some research suggests measurable change in annual runoff may occur with a 20% or greater reduction in basal area (Jones 2004), or a harvest area that is $\geq 25\%$ of the total catchment (Stednick, 2000). The proposed vegetation treatments under Alternative 1 that will affect near or greater than 25% of the total watershed area occur within the Barnes Flat (21%), Swain Meadow (21%), and Unnamed Watershed (35%). However, the highly fractured basalts and well-drained soils that are found throughout the project area have the ability to moderate surface water runoff with their high infiltration rates. Because of these characteristics the project area should be less sensitive to runoff-related issues associated with changes in ground cover. Therefore, it is unlikely that the forest treatments proposed under Alternative 1 will have any significant effect on timing, intensity, or duration of peak flows.

Increased compaction as well as increases in road/stream connectivity can increase runoff and raise peak flows. The implementation of BMPs and adherence to wet weather soil moisture requirements would minimize project related compaction. An IDF requires remediation of unit soils if the LRMP standard of 15% areal extent detrimental porosity loss is exceeded.

Water drafting would occur if Alternative 1 is implemented. Water drafting into a water truck has the potential to decrease stream flow while the drafting is occurring. To minimize the impact to stream flow from water drafting, an IDF would be implemented as part of Alternative 1 that states “Water drafting would cease when bypass surface flows drop below 2.0 cubic feet per second”.

Stream Flow – Swain Meadow Treatments

Reconnecting streams to their historic floodplains has been documented to extend stream flow later into the season (Hunt et al. 2018). The proposed treatments under Alternative 1 will raise the base elevation of several hundred feet of incised channels, thereby increasing connectivity with the floodplain. This effect may extend stream flow later into the season.

Streamflow is typically seasonal in nature within Swain Meadow. To minimize negative effects associated with in-channel restoration work, stream channel treatments in Swain Meadow will occur when in-channel flow has ceased. If streamflow within Swain Meadow is present throughout the entire year (e.g., following exceptionally large winter precipitation totals), treatment activities will be performed when streamflow has reached baseflow conditions. Because transport capacity will be minimal to non-existent at the time of treatment, no negative effects on downstream water quality are anticipated from these actions.

Channel Stability

Mechanical equipment used during fuels treatments would be allowed to work within the RCA as part of the proposed action. The width of the equipment exclusion zone varies by the steepness of the slope being worked on. The equipment exclusion zone is 50 feet from perennial channels and 25 feet from seasonal channels in areas where the slope is less than 20%. Where the slope is greater than 20%, the equipment exclusion zone is 150 feet from perennial channels, and 50 feet from seasonal channels. BMPs and IDFs listed in the PA and this report would be implemented to protect channel morphology from adverse changes. These measures, which include retaining conifers necessary for stream bank stability and leaving in place any trees felled for safety, would help protect bed/bank stability and minimize adverse effects.

Direct effects to Robbers Creek within Swain Meadow include the removal and replacement of riparian/wetland herbaceous vegetation along approximately 13,000 feet of channel. This effect will be temporary as the vegetation and topsoil will be salvaged and watered for survival until replanted on top of the riffle areas.

In the long-term, the condition of the primary and secondary flow paths and wetland vegetation within Swain Meadow is expected to improve to the point of being hydrologically functional such that it would be rated as in *Proper Functioning Condition*. This means that the entire meadow should become wetter and stay wetter for a longer period of time in the summer and early fall. This in turn should result in an increase of the abundance of riparian/wetland vegetation. In addition, active erosional features (i.e. existing Robbers Creek and incised secondary channels) will be changed to more natural erosional processes. The reasons for these conclusions are listed below.

- The incised channels in the meadow would be treated so as to prevent those erosional features from pulling groundwater out of the meadow so those features cannot become larger. The method of treatment would be to raise the riffle elevations within the channels to higher elevations
- The higher elevation of riffles in channels will encourage flooding of the meadow surface on a more regular basis, resulting in the channels and meadow remaining more wet and staying wetter for longer periods of time. This in turn will increase the amount of wetland/riparian vegetation adjacent to each channel.
- Overall, the rehydration of the meadow surface, remnant channels, and secondary channels, is expected to extend flow duration of Robbers Creek longer into the growing season compared to existing conditions as noted earlier.

Water quality - temperature, sediment and chemicals

Fuels treatment activities under Alternative 1 with the potential to affect water quality include the proposed mechanical and prescribed burning treatments, road maintenance, watershed improvements, chemical treatments of stumps, and the effect of reduced canopy cover on stream temperatures.

Mechanized equipment can displace soil, create ruts and remove ground cover, which can lead to excessive erosion and deposition of sediment into stream systems. Burning can remove ground cover and create areas of hydrophobic soil conditions, leading to accelerated runoff, erosion and deposition of sediments. Sediment disturbance from road related activities could cause a temporary increase in sedimentation if the road crosses a stream. Integrated Design Features (IDFs) would be implemented to address these possible effects (see Appendix B for IDFs). These measures, when implemented, are effective in reducing sedimentation caused by timber harvest and prescribed burning activities (Litschert and MacDonald, 2009; Rashin et al, 2006).

One IDF states “Cut stumps of live conifers with a 14-inch stump diameter would be treated with an EPA-approved borate compound which is registered in California for the prevention of annosus root disease. No EPA-approved borate would be applied within 25 feet of known Sensitive and Special Interest Plants or within 25 feet of live streams and meadow/wetlands. This borate compound, commonly referred to as borax, is either sprinkled on stumps as a dry granular substance or sprayed on as a liquid. The application rate for borax is typically 1lb/acre for the dry compound. Studies have shown, at this application rate, borax does not pose a significant risk to humans or wildlife (USDAFS 2006). After application, borax will slowly break down in the soil. The primary byproduct of the breakdown of borax is boron, which is a naturally occurring mineral found in most soils. The potential for borax leaching into groundwater is low as borax is adsorbed onto mineral particles in soil. Since borax would not be applied within 25 feet of water, the potential for contamination to surface water is also low (USDAFS 2003). Integrated Design Features (IDFs) would be implemented to address these possible effects (see Appendix B for IDFs).

Machine piling is proposed on 2,254 acres. Machine piling involves hauling/moving slash into piles for burning. Machine piling typically produces more ground disturbance than hand piling as the equipment must drive to each location where slash is to be piled. Machine piling also is able to remove both the larger material and the smaller material when moving slash into piles and therefore has the potential to disturb ground cover. IDF #32 states “Machine piling operations would remove only enough material to accomplish project objectives and would minimize the amount of soil being pushed into burn piles.

Duff and litter layers would remain as intact as possible, and the turning of equipment would be minimized.” Leaving duff and litter would provide ground cover that will help stabilize the units where machine piling is slated.

Several changes to roads are proposed to the transportation system of the Lassen National Forest, as part of Alternative 1. Approximately 0.30 miles of new road construction is being proposed to be added to the road system (i.e. ML1) and 7.0 miles of temporary roads. Several miles of roads/routes are proposed to be decommissioned (approximately 11 miles), and 1.06 miles are proposed for reconstruction (see Appendix A maps 3 and 4).

Alternative 1 proposes to thin conifers within RCAs. Thinning along stream channels has the potential to influence stream shading and stream temperature. This work would include:

- An average of 10 to 20 percent canopy cover of conifers would be retained throughout the RCA where it where higher percent cover of conifer currently exists.
- Riparian species would not be removed through the proposed thinning activities.

- Trees that are growing along the stream channel and providing stability to the stream banks would be retained.
- Conifers 30 inches DBH and greater and snags 15 inches DBH and greater would be retained within the limits of safety and operability.

Seasonal stream channels in the project area range from small headwater channels with little or no riparian vegetation present along their length to larger channels that do have riparian vegetation. The smaller seasonal channels will frequently only flow during the spring snow melt period, and during and for a short period after rain events. As these streams are not flowing water in the summer, when stream temperatures are typically the warmest and the most susceptible to temperature increases (Moore et al, 2005), they should have little or no influence on the stream temperature of water bodies downstream.

Robbers Creek is the only perennial channel with treatments proposed. This work is proposed along approximately 4,200 feet of the low flow channel of Robbers Creek, and another 8,800 of secondary channels. Riparian species would not be cut, and where present, would continue to provide stream shading. There is a mechanical exclusion zone from 25 feet from the edge of Robbers Creek (on slopes <20%). In most locations where conifers are present within the equipment exclusion zone, hand thinning of smaller trees will be allowed but larger trees would be retained. However, in order to reach the desired conditions in some areas (i.e. aspen enhancement), equipment is necessary to remove the larger trees or strategically place trees for channel stability. Because mostly hand thinning of smaller non-riparian species would be cut in the vicinity of the channel, and larger trees would be retained for future recruitment, it is not anticipated that there would be an increase in stream temperature.

As part of the proposed action, thinning is proposed in and around RCA in 14 miles of seasonal and perennial channels. To accomplish this work, skid trails may be required in some RCAs. To mitigate the potential impact of skid trails located within an RCA, several IDF's are proposed to address their placement and use. To minimize the risk of additional soil disturbance from skid trail construction, no cut and fill would be allowed for new skid trail construction within RCA. Skid trails within RCA would be kept to a minimum. No waterbars would be installed on skid trails within RCA following treatment. Once the skid trails are no longer required for project activities, the skid trails would require a minimum of 90 percent ground cover spread over them. Increased ground cover has been shown to greatly reduce the potential for erosion. This reduction is attributed to both increasing the ground roughness which will decrease the velocity of water as it flows over the ground, and by the ground cover capturing sediment that does move (Litschert and MacDonald, 2009). Implementing these IDF's should minimize the impact of using skid trails within RCA.

Riparian Conservation Areas

Equipment restriction zones would be established within Riparian Conservation Areas (RCAs) measured from the edge of the stream channel or aquatic feature (Table 8). Equipment would be permitted to reach beyond mechanical restriction zone boundaries into the RCA, but not allowed to enter. RCA widths and mechanical restriction zones vary by aquatic feature and are outlined in Table 8. Note: In limited instances where equipment is needed to create desired condition, mechanical equipment exclusion zones may be modified with the approval of a qualified specialist.

Table 8: RCA widths and overview of mechanical restriction zones (measured from the edge of the aquatic feature)

| Aquatic Feature | RCA width | Ground-based mechanical equipment exclusion zone | | Burning | |
|----------------------------------|-----------|--|------------------------|---|--|
| | | Slope 20% or less | Slope greater than 20% | Piles (distance from riparian vegetation) | Underburn Ignition (distance from aquatic feature) |
| Perennial stream | 300 ft. | 25 ft (except units 307 and 309) | 150 ft | 25 ft | 50 ft |
| Seasonal stream | 150 ft | 10 ft | 50 ft | 25 ft | 50 ft |
| Lake, wetland, wet meadow | 300 ft | No distance exclusion zone* | | 25 ft (except unit 504) | Variable* |
| Springs | 300 ft | 10 ft | 50 ft | 25 ft | 50 ft |
| Fen | 300 ft | 150 ft | 150 ft | 150 ft | 150 ft |
| *Swain Vernal Pool | 300 ft | <10% = 50 ft. | >10%=300 ft. | <10% slopes = 50 ft. >10% = 300 ft. | 300 ft |
| Other Vernal Pools | 300 ft | 10 ft | 50 ft | 25 ft | 50 ft |

*See Appendix B IDFs for additional information

Cumulative Effects

Cumulative watershed effects (CWE) include past, present and foreseeable future ground disturbing activities within a subwatershed on both public and private lands. Cumulative watershed effects can occur on site or downstream of land disturbing activities. These effects may be either beneficial or adverse and result from additive changes in watershed structures and processes caused by multiple land management activities or natural events within a watershed. Changes in flow regimes, especially peak flows, and sediment introduced to streams can combine to upset the dynamic sediment transport/stream flow equilibrium conditions.

Cumulative watershed effects were analyzed using the Equivalent Roaded Area (ERA) method. This method uses forest roads as the standard to which all other watershed impacts are compared. Activities that could produce erosion within the watershed are each given a disturbance coefficient ranging from zero to one to express the impact of that activity as it compares to forest roads. Forest roads will always have a disturbance coefficient of 1. Most activities within a watershed are assumed to recover from their initial state of disturbance, back to a natural state, within some timeframe. This recovery is incorporated into the ERA model by assuming a rate at which each activity recovers over time.

The Threshold of Concern (TOC) is an ERA value that represents the value at which the risk of negative impacts to the subwatershed becomes elevated. The TOC for all sub-watersheds in the analysis area is 15% ERA (LRMP, 1992). Comparing the ERA to the TOC gives us an idea of the health of a subwatershed. While it is likely that the proposed treatments will be implemented over the course of several years, for cumulative effects analysis Alternative 1 was assumed to have been fully implemented in 2021. This

provides the most conservative estimate of CWE's related to the Proposed Action. In Table 9, the ERA is displayed as both calculated ERA (acres) and as a percentage of the TOC.

The ERA model assigns a risk using cumulative effects from activities that may occur. A low risk of cumulative watershed effects is defined as an ERA of less than 50% of the TOC; moderate risk is between 50% and 80% of TOC; and high risk of cumulative watershed effects is between 80% and 100% of TOC.

Table 9: Equivalent Roaded Acres and the Threshold of Concern for Alternative 1 for years 1 and 10.

| Subwatershed | 1 Year post Action (2022) | | 10 Years Post Action (2031) | | Risk of CWE | |
|--|---------------------------|-----------------|-----------------------------|-------------|---------------------------|----------------------------|
| | ERA | ERA as % of TOC | ERA | ERA% of TOC | 1 Year post Action (2022) | 10 Years Post Action(2031) |
| Alternative 1 - Proposed Action | | | | | | |
| Westwood | 71.4 | 10% | 35.5 | 5% | Low | Low |
| Upper Dry Creek | 67.1 | 10% | 33.8 | 5% | Low | Low |
| Unnamed | 533.2 | 84% | 160.0 | 25% | High | Low |
| Tamarack Springs | 234.0 | 32% | 94.0 | 13% | Low | Low |
| Swain Meadow | 603.7 | 71% | 373.8 | 44% | Moderate | Low |
| Robbers Spring | 185.6 | 17% | 104.0 | 9% | Low | Low |
| Barnes Flat | 309.3 | 68% | 252.3 | 55% | Moderate | Moderate |
| Alternative 2 - No Action | | | | | | |
| Westwood | 28.6 | 4% | 19.6 | 3% | Low | Low |
| Upper Dry Creek | 20.9 | 3% | 17.8 | 3% | Low | Low |
| Unnamed | 233.6 | 37% | 76.2 | 12% | Low | Low |
| Tamarack Springs | 71.6 | 10% | 42.0 | 6% | Low | Low |
| Swain Meadow | 342.5 | 40% | 135.5 | 16% | Low | Low |
| Robbers Spring | 90.2 | 8% | 67.9 | 6% | Low | Low |
| Barnes Flat | 65.8 | 14% | 48.5 | 11% | Low | Low |

All subwatersheds with the exception of the Unnamed Watershed are at low or moderate risk levels for CWE in years one and ten, post project implementation. The Unnamed Watershed is of high risk (84% TOC) in year one but returns to low risk levels by year 10. Directly upstream of the Unnamed Watershed, 174 acres of meadow restoration will occur under Alternative 1. These treatments would have the indirect effect of maintaining and enhancing meadow and channel functions of Swain Meadow and Robbers Creek. Functional meadow systems with channel-floodplain connectivity have the ability to reduce peak flows, reduce suspended sediment loads, promote surface water infiltration, and help maintain longer duration base flows. Since this work will take place directly upstream of the Unnamed Watershed many of the potential adverse effects associated with the proposed action may be mitigated by these treatments. Additionally, meadow restoration treatments and their associated watershed benefits are not captured in the ERA model therefore, CWE's as estimated by the ERA method are likely overestimated in the Unnamed Watershed. ERA% can be used as an indicator for cumulative effects on stream flow and channel stability. When more acres are in an effectively "roaded" condition, runoff is delivered more quickly through a

watershed, and peak flows are elevated. Since no subwatershed in the analysis area would exceed the TOC, detrimental increases in peak flow would not be anticipated.

Alternative 2 – No Action

Direct and Indirect Effects

There are no direct effects of choosing the no action alternative. No management related land disturbance would occur so there would be no additional sources of sediment.

An indirect effect of not carrying out the proposed action would include trends toward increased stand densities and conifer encroachment. Continued conifer encroachment would potentially decrease water content in the soil. This may result in lowered water tables and decreased herbaceous plant diversity and productivity.

Another indirect effect would be the continuance of increased fuel load within the project area, since no fuel treatments would be implemented. If a fire started in the area, the more continuous untreated fuel load would lead to higher potential for a large fire, as well as increase the potential for higher intensity burning. This would likely remove groundcover, adversely affect soils, remove shading from streams, and increase sediment loads in streams.

A final indirect effect would be the continued degradation of Robbers Creek within Swain Meadow. Without actions, the channel will continue to drop in elevation and widen, which will increase sediment to downstream areas and lower surrounding water levels.

Cumulative Effects

Under the no action alternative, only previously identified, ongoing and future vegetation management activities would take place within the subwatersheds (PORFFA, project record). Equivalent Roded Area (ERA) values have been calculated for all of these treatments. There would be no additional risk of cumulative watershed effects based on the ERA model. However, a cumulative effect of the no action alternative would be a continuing trend toward increased stand densities and conifer encroachment leading to potentially decreased water yields and lower water tables in the future. There would likely be no beneficial cumulative effect associated with the maintenance of roads associated with this project, and would therefore continue to have the same ability to deliver sediment to stream channels.

Under Alternative 2, the ERAs for the seven subwatersheds would all be lower when compared to the ERAs under Alternative 1 (Table 9), all of which are rated “low.”

Botanical Resources

Environmental Consequences

Alternative 1 – Proposed Action

Direct and Indirect Effects

Threatened and Endangered Plant Species

Slender Orcutt Grass (*O. tenuis*) plants – direct effects

Direct effects to individuals of *Orcuttia tenuis* could occur if plants were directly injured or killed prior to seed set, thus eliminating the annual contribution of that plant to the seed bank. Seed set is vital for *Orcuttia tenuis*, an annual species that depends on soil seedbank reserves for persistence (Griggs and Jain 1983).

With the implementation of the proposed project, including Integrated Design Features, there would be no potential for project activities to injure or kill individuals of *Orcuttia tenuis*, because project activities are excluded from within Swain Vernal Pool. All activities would occur outside of occupied vernal pools.

Vernal Pool Habitat – direct effects

With the inclusion of Integrated Design Features specific to Swain Vernal Pool, there would be no potential for direct effects to vernal pool habitat due to soil compaction or soil displacement from any project activity, because ground-based mechanical equipment would be excluded from within 50 ft. of the vernal pool, and from within 300 ft. where slopes exceed 10%. In addition, main skid trails would occur at least 100 ft. from the vernal pool edge and only on slopes < 20%. Hand piling of fuels would not occur within 50 ft. of the pool perimeter, and so soils within the pool would not be impacted from this activity. While underburning may occur within adjacent habitat in the spring while the pool still holds water, no ignitions would occur within 300 ft. of Swain Vernal Pool, eliminating the possibility that fire would carry through or burn into occupied portions of the vernal pool.

Slender Orcutt Grass (*O. tenuis*) plants and Vernal Pool Habitat – indirect effects

While potential vernal pool habitat occurs elsewhere in the project area, these pools would also be protected with mechanical exclusion zones and restrictions on piling and underburning ignition near the pools. In summary, there would be no direct effects to individual plants of *Orcuttia tenuis* or to *Orcuttia tenuis* vernal pool habitat from the implementation of the proposed action of the Robbers Project.

Potential indirect effects to *Orcuttia tenuis* occurrences and habitat include the following:

- Sediment movement into Swain Vernal Pool
- Accessibility of Swain Vernal Pool to motorized vehicles or livestock
- Vernal pool hydrology
- Competition from invasive plant species.

Sedimentation into Swain Vernal Pool would present a risk to *O. tenuis* if displaced soil that had travelled from outside of the pool were to bury seeds too deep for them to germinate the following year, or impact pool hydroperiod by filling the pool such that it could no longer support *Orcuttia* plants. Multiple IDFs address the potential for sedimentation, including the exclusion of mechanical equipment or end lining within 50 ft. of the pool edge, the exclusion of mechanical treatments on slopes > 10% within the 300 ft. RCA, the exclusion of hand piles within 50 ft. of vernal pool edges and on slopes < 10%, the placement of slash on skid trails within the 300 ft. RCA, and the exclusion of main skid trails from 100 ft. of the vernal pool perimeter and then only on slopes < 20% .

The topographic setting of the Swain Vernal Pool further reduces the risk of sedimentation. Swain Vernal Pool is perched on a terrace, and does not drain a very large area. Although the topographic setting at Swain differs from the extremely broad and flat landscape positions of pools on the Modoc Plateau, there is nothing to suggest that the primary hydrologic input to the pool is run-off instead of snowmelt. The area within 100 ft. of the pool is flat, providing a buffer for any sediment to settle out before it would reach the pool.

Indirect effects could also occur due to thinning of forested stands adjacent to the Swain Vernal Pool, which would open the understory by removing trees that currently impede the movement of motorized traffic and livestock through the uplands around the pool. These activities may affect access and usage patterns by livestock and motorized vehicle traffic; however, these indirect effects of thinning activities would be offset by project actions that are designed to reduce motorized vehicle trespass.

A primary point of access is along road 30N07, which is located 100 ft. north of the pool, and currently serves as an access point to motorized vehicle trespass in and around Swain Vernal Pool. The project would not only construct a fence to eliminate the most common access points from Road 30N07, but would also block 0.64 miles of mapped non-system routes within the pool with boulders placed outside the pool perimeter. Post-implementation, motorized vehicle trespass is predicted to decrease relative to current levels.

Thinning within stands and outside of the RCA may also change livestock use patterns by making the pool more accessible to livestock traffic. While this is possible, the Almanor Range Management Specialist has stated that livestock already have the ability to access the pool, and that it is unlikely that they would increase their use of the pool post-thinning due to the availability of better forage along the Robbers Creek corridor (McProud 2020, personal communication). In addition, ground disturbance through hoof punching is also not a concern because late-season grazing such as occurs on the Robbers Creek allotment can provide a net beneficial effect to *O. tenuis* by reducing litter cover and exposing bare ground (Merriam et al. 2016). As a result, this indirect effect is therefore predicted to have minimal impact to *O. tenuis* plants or habitat.

Another indirect effect of the project could occur if thinning or burning treatments in adjacent habitat had an effect to vernal pool hydrology; however, because vernal pool hydrology on the Modoc Plateau is primarily influenced by snowmelt and not run-off from adjacent habitat (Montrone et al. 2019), the effect of tree removal is expected to be negligible. If there is, however, any sub-surface connectivity between the pool and adjacent habitat, thinning treatments would reduce the uptake of water by trees and could have a small beneficial effect to pool hydroperiod with potential increases in pool depth or inundation.

An additional indirect effect to consider is the project potential to increase invasive species. The Robbers Project area, however, is found in a relatively weed free portion of the Lassen NF (USDA Forest Service 2020a), and most weeds are restricted to the A-21 County Highway corridor. The two occurrences that are within 1/8 mile of the pool are small occurrences that are monitored and treated annually. In addition, Integrated Design Features ensure that all off-road equipment be weed-free prior to entering the Forest, and that any new occurrences found prior to project implementation would be manually controlled or avoided prior to project activities, further reducing indirect effects from potential invasive species introduction. Overall, the Invasive Species Risk Assessment for the Robbers Creek Watershed Project determined that there was a low to moderate overall risk of spreading noxious weeds within the implementation of the proposed project into the project area (Robbers Project Record).

Sensitive Plant Species

Within the Robbers Project area all potential habitat for *Meesia uliginosa* has been well-surveyed and the known occurrence is excluded from project activities with Integrated Design Features. As result, there would be no direct, indirect or cumulative effects to this species from the implementation of Alternative 1. Direct effects to *Botrychium sp.* involve physical damage to plants or their habitat. Thinning treatments (hand, mechanical), and prescribed fire treatments (pile burning, underburning) all have the potential to directly affect plant species. *Botrychium minganense* (BOMI-033) is located within a proposed mechanical treatment unit, however, IDFs specify that this occurrence would be protected through flag-and-avoid methods and would exclude project activities within 25 feet. In addition, trees would be directionally felled away from the occurrence, and prescribed fire would not be ignited within this occurrence. With the incorporation of integrated design features, no direct effects to this occurrence are anticipated. *Botrychium montanum* (BOMO-039) is located within Bandit Fen. Integrated Design Features specify that live vegetation and snags would be retained, and that ground-based mechanical equipment, piles, and underburning ignition would be excluded within 150 ft. of Bandit Fen. As such, no direct effects are anticipated for this species.

Although botanical surveys have been performed to protocol within the project area, it is possible that isolated individuals of *Botrychium minganense*, *Botrychium montanum*, or other Sensitive *Botrychium* species may have been missed. As a result, there is a potential for undiscovered individuals to be impacted inadvertently, most likely during treatments that occur within RCAs, since these species are found primarily on streambanks in areas of permanently saturated soil. However, with the implementation of Integrated Design Features, mechanical exclusion zones would protect any undiscovered occurrences from direct impacts. In addition, while the above ground parts of *Botrychium* species could be killed by fire during fuels treatments activities, in the long-term, these species have been found to tolerate the low to moderate intensity fires (Johnson-Groh and Farrar 1996) that would be most likely to occur within RCAs, since fire will not be ignited within 50 ft. of aquatic features. Additionally, if new occurrences are found before or during ground disturbing activities, they would be protected by flag and avoid methods as stated in the Integrated Design Features for all action alternatives.

Indirect effects due to project-related changes to environmental conditions for *Botrychium minganense* could include the removal of a few trees within a tree-length of BOMI-033. However, because project activities are excluded within 25 ft. of the occurrence, and the area east of the occurrence is outside of

treatment units, this effect is expected to be minor. *Botrychium* species can be sensitive to drought so actions that promote late season water availability around the seeps where *Botrychium* sp. occur would constitute a beneficial effect (Ahlenslager and Potash 2007).

An additional indirect effect could occur from project related changes to fire regime include the overall effect of treatments that would modify landscape-level fire behavior and reduce the spread and extent of high severity fire. While *Botrychium* species appear to tolerate low to moderate severity fire (Johnson-Groh and Farrar 1996), high severity fire may cause mortality to individuals or adverse changes to habitat. While we cannot predict where and when Sensitive plant occurrences may encounter future fire, thinning and fuels treatments that break up horizontal and vertical fuels continuity and promote fire-resilient tree species would have the beneficial indirect effect of reducing the potential for high severity fire within Sensitive plant occurrences.

No indirect effects from invasive plants to *Botrychium* species are anticipated due to the low overall number of invasive plants within the project area, and the current restriction of most known invasive plant occurrences to the Lassen County road A-21 corridor, away from rare plant occurrences.

Cumulative Effects

Threatened and Endangered Plant Species

A cumulative effect can result from the incremental impact of the proposed action when added to the effects of past, present, and reasonably foreseeable future actions. Cumulative effects for *Orcuttia tenuis* are spatially bounded by the Robbers Project area and temporally bounded by a 20-year timeframe.

Past Actions

Current inventories of *Orcuttia tenuis* capture the aggregate impact of past human actions and natural events that have led to the current inventory of this species within the project area (CEQ 2005), regardless of which particular action or event contributed to current conditions. Natural events include interannual variation in precipitation and snowpack, which drive annual fluctuation in population numbers for *O. tenuis*. The effects of past climatic trends can contribute cumulatively to the distribution and abundance of *O. tenuis* within the project area because *O. tenuis* is an annual species that relies upon its seedbank for population persistence. The Swain population, however, appears fairly resilient to interannual variation in snowpack, with a robust population observed in seven out of the eight years that it has been monitored since 1998 (USDA FS 2020b).

Ongoing Actions

While the Swain Vernal Pool is currently being impacted by ongoing recreation and wood cutting activities within the pool, these will be eliminated with proposed fence construction and decommissioning actions associated with unauthorized routes adjacent to the pool. As a result, these ongoing actions will not add cumulatively to those effects from the implementation of Alternative 1.

Other ongoing actions, such as trail and routine road maintenance, special uses activities, Christmas tree cutting, public recreation, and recreation maintenance may be contributing only incidental effects to *O. tenuis*, if any. See Appendix C, the Past, Ongoing, and Reasonably Foreseeable Future Actions Report (PORRFA) for descriptions of additional actions within the Robbers Project area.

Future Actions

As with ongoing action, other future actions on NFS lands would be surveyed to similar standards to ensure that any impacts to *Orcuttia tenuis* or potential vernal pool habitat are either beneficial or mitigated so that the long-term viability of the *O. tenuis* on the forest is maintained. In addition, future projects would incorporate similar design features to flag and avoid known occurrences of *O. tenuis* and vernal pool habitat unless the project is intended to restore or enhance the species, or its habitat or potential impacts are believed minor. Ongoing and future actions on adjacent private lands may also add cumulatively to those effects from the implementation of Alternative 1, but since survey requirements and mitigations are not known on these lands, the type and extent of impacts to these species or their potential habitat cannot be quantified.

In summary, Alternative 1 of the Robbers Project would treat approximately 4,745 acres with hand and mechanical thinning and piling, meadow restoration activities, and the reintroduction of fire. Of these acres, 36 are within the Swain Vernal Pool RCA. With the incorporation of Integrated Design Features, these actions would avoid or minimize impacts to *Orcuttia tenuis*, Swain Vernal Pool, and other vernal pool habitat. Although the effects of past, ongoing and future actions would add cumulatively to project effects to *Orcuttia tenuis*, these effects would not lead to a loss of viability for these species within the Robbers Project area or across the Lassen NF for at least the next 20 years.

Sensitive Plant Species

Cumulative effects for all species analyzed within this document are spatially bounded by the Robbers Project area and temporally bounded by a 20-year timeframe. Cumulative effects would result when the direct and/or indirect effects of Alternative 1 on a given species add incrementally to the effects of past, present, and reasonably foreseeable future actions.

Cumulative effects will be analyzed for *Botrychium minganense*, *Botrychium montanum*, and other *Botrychium* species with potential habitat within the project area (*B. ascendens*, *B. crenulatum*, *B. montanum*, *B. pedunculatum*, *B. pinnatum*). Ongoing actions have similar effects to these species as the Robbers Project, since all projects have either been surveyed to similar standards as the Robbers Project or would be prior to project implementation. In addition, future projects would incorporate similar design features to flag and avoid known occurrences of Sensitive plant species unless the project is intended to restore or enhance the species or its habitat or potential impacts are believed minor. Ongoing actions with the greatest potential to affect Sensitive plant species within the Robbers Project include livestock grazing and personal fuelwood use.

The Robbers Project area intersects the Clover Valley, Robbers Creek, and Duck Lake grazing allotments, which are all active allotments. *Botrychium* species may be susceptible to impacts by livestock, especially along seeps or within fens where plants growing along the banks or in organic soils can be damaged and their habitat destroyed by trampling (Ahlenlager and Potash 2007). Trace evidence of livestock traffic was observed when *Botrychium montanum* (BOMO-039) was first observed in 2011, but no adverse impacts to plants or habitat was documented, and no evidence of livestock trailing was observed in 2019 (USDA FS 2020a). Cumulative impacts of livestock grazing to these species are therefore expected to be minor.

Personal fuelwood use is an ongoing action with documented effects to Sensitive plant occurrences. Off-road motorized vehicle tracks were observed adjacent to the occurrence of *Botrychium montanum* (BOMO-039). Removal of lodgepole trees adjacent to Bandit Fen was also observed, and such ongoing actions may

have the potential to reduce future wood recruitment into the fen or expose the peat body to oxygen if motorized vehicles access the fen itself. These rare plant occurrences are somewhat protected by the high-water table within the fen, which may discourage motorized traffic from accessing the wettest portions of the meadow complex, where rare plants occur. An additional impact from personal fuelwood use was documented in 2011, when a lodgepole was cut adjacent to the western patch of BOMI-033, and debris and branches were found atop a portion of the occurrence (USDA 2020a).

Other ongoing actions, such as trail and road maintenance, special uses activities, Christmas tree cutting, public recreation, and recreation maintenance may be contributing only incidental effects on these species, if any (see PORFFA). As with ongoing action, future actions on NFS lands would be surveyed to similar standards to ensure that any impacts to Sensitive plant species are either beneficial or mitigated so that the long-term viability of the Sensitive species on the forest is maintained. Ongoing and future actions on adjacent private lands may also add cumulatively to those affects from the implementation of Alternative 1, but since survey requirements and mitigations are not known on these lands, the type and extent of impacts to these species or their potential habitat cannot be quantified.

Determinations

In summary, Alternative 1 of the Robbers Project would treat approximately 4,745 acres with some combination of ground-disturbing activities such as mechanical or hand thinning, and fuels treatments that include mechanical or hand piling, and underburning. With the incorporation of Integrated Design Features, these actions would avoid or minimize impacts to known occurrences of Sensitive plant species and their habitats. Although project effects would add cumulatively to the effects of past, ongoing and future actions on *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pedunculatum*, and *Botrychium pinnatum*, these effects would not lead to a loss of viability for these species within the Robbers Project area or across the Lassen NF for at least the next 20 years.

While the Robbers Creek Watershed Restoration Project would have no direct effects to *Orcuttia tenuis* plants or vernal pool habitat, there would be the potential for indirect effects to *O. tenuis*, primarily from vehicle traffic associated with personal fuelwood or recreational use and the potential for project-related sedimentation to the pool. With the incorporation of proposed actions that specifically address vehicle trespass and integrated design features that reduce the probability of sedimentation, the Robbers Creek Watershed Restoration Project may affect but is not likely to adversely affect *Orcuttia tenuis* or vernal its pool habitat within the project area.

With the incorporation of project Integrated Design Features, the implementation of Alternative 1 of the Robbers Project would have no effect to *Meesia uliginosa* because all potential habitat has been well-surveyed, and no project activities would occur within 150 ft. of the known occurrence. In addition, due to the incorporation of Integrated Design Features, the Robbers Project may affect individuals or habitat for *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pinnatum*, *Botrychium pedunculatum*, but is not likely to result in a trend toward federal listing or loss of viability for these species.

Alternative 2 – No Action

Direct and Indirect Effects

Threatened and Endangered Plant Species

There would be no direct effects to *Orcuttia tenuis* plants or vernal pool habitat other than those associated with ongoing activities. Under the No Action Alternative, the partial fence along the northern edge of the Swain Vernal Pool would not be repaired or improved and therefore current off-road impacts from off-road motorized vehicles would continue. There would not, however, be the minor risk of sedimentation to Swain Vernal Pool from mechanical timber harvest activities as described for Alternative 1.

The threat of invasive species invasion with the implementation of the No Action Alternative is also not a concern, since the Invasive Plant Risk Assessment for the Robbers Project (Project Record) determined that there was low current habitat vulnerability and a low risk from non-project related vectors. In addition, since priority occurrences of invasive plants within the project area would be treated regardless of the alternative chosen as part of the ongoing Lassen National Forest Invasive Plant program, increased threat from invasive plants with the implementation of the No Action alternative is not an issue.

Sensitive Plant Species

There would be no direct effects to *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pedunculatum*, *Botrychium pinnatum*, or *Meesia uliginosa*, other than those associated with ongoing activities.

Indirect effects of no action would be those associated with continued increases in tree density in the absence of disturbance, the current and future threat of invasive plant infestations, and the increased potential for high severity wildfire.

Continued trends of increasing tree density around the known *Botrychium minganense* site (BOMI-033) may lead to increased vegetative draw-down on water resources that feed the seeps associated with this occurrence.

The threat of invasive species invasion with the implementation of the No Action Alternative is not a concern, since the Invasive Plant Risk Assessment for the Robbers Project (Project Record) determined that there was low current habitat vulnerability and a low risk from non-project related vectors. In addition, since priority occurrences of invasive plants within the project area would be treated regardless of the alternative chosen as part of the ongoing Lassen National Forest Invasive Plant program, increased threat from invasive plants with the implementation of the No Action alternative is not an issue.

Finally, it is impossible to determine where, when and how a wildfire may enter an area, thus analyzing the effects of wildfire to Sensitive plant populations can only utilize fuels models that describe the probability of how a stand would burn should fire occur on the landscape. Many times, the impacts from fire suppression activities can have larger effects to Sensitive plants and their habitat than the wildfire itself, and actual effects to Sensitive species depends on fire timing and severity. In the absence of thinning and prescribed fire, stands would continue to be at higher risk of wildfire transitioning from surface and mixed intensity understory fire behavior to torching and crowning type fire behavior (Robbers Fuels Report, Project Record). Although *Botrychium* species appear able to survive low to moderate severity fires that do not kill mycorrhizal soil fungi, a high intensity fire could heat the soil enough to kill *Botrychium* plants and/or mycorrhizal fungi (Johnson-Groh and Farrar 1996). In addition, the Conservation Strategy for *Meesia uliginosa* states that although fens are resilient to most wildfires, high severity fire during drought years could have detrimental and irreversible impacts to fen habitat for this species (USDA FS 2005a). Hydrologic changes and increased erosion could also follow a high intensity fire, due to the loss of stabilizing vegetation and duff. Such changes could adversely affect habitat for *Botrychium* species or *Meesia uliginosa*.

Threatened and Endangered Plant Species

Cumulative effects for past, ongoing and foreseeable future actions for Alternative 2 would be identical to those previously discussed within Alternative 1. Past, ongoing and future actions discussed within the project area would continue to add cumulatively to existing conditions.

Sensitive Plant Species

A cumulative effect can result from the incremental impact of the action when added to the effects of past present, and reasonably foreseeable future actions; however, under the No Action alternative there is no action upon which to add. The only potential long-term indirect effects are due to tree densification and the risk of high severity wildfire for *Botrychium* species and *Meesia uliginosa*. Cumulative effects would not be expected to affect the viability of *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Botrychium pedunculatum*, *Botrychium pinnatum*, and *Meesia uliginosa* within the Robbers Project area or across the Lassen NF for at least the next 20 years.

Silviculture

Environmental Consequences

Alternative 1 (Proposed Action)

Direct and Indirect Effects

Alternative 1 would improve stand structure and species diversity of mixed conifer and east side pine forests to reflect a more fire adapted and resilient ecosystem. Treatment would include thinning (mechanical and hand), piling activity created and surface fuels (machine and hand), and prescribed fire (pile and underburning) (see maps 1 and 2 in Appendix A). Treatments include mechanical thinning, hand thinning, and prescribed fire. See Appendix B for integrated design features that are incorporated into Alternative 1.

Treatment A – Upland Forest

Mechanical Thinning

Approximately 2,254 acres of upland forest or meadow ecotone are proposed to be mechanically thinned with Alternative 1 (see Table 1). Mechanically thinned areas would employ variable density thinning (VDT). VDT would promote a more desired mixture of tree species and sizes as well as structural diversity (a mixture of clumps of trees, openings, and matrix) that provides for improved forest health (increased tree and stand vigor) and a variety of wildlife elements while creating a fire resilient stand (decrease canopy continuity and the reduction of surface and ladder fuels).

Concepts from the Pacific Southwest Region General Technical Reports (GTR), An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests (North 2009) and Managing Sierra Nevada Forests (North 2012) would be applied to meet the desired conditions for the project area. Trees would be thinned using a modified thin from below prescription to vary density throughout a treatment unit. Trees would be retained in groups separated by moderately treed or open gap conditions to create a mosaic stand structure. Variable density thinning would encourage horizontal and vertical structural diversity.

In areas proposed for mechanical treatment, ground-based equipment would be utilized on slopes up to 35 percent to harvest merchantable trees less than 30 inches diameter at breast height (DBH). Unit 144 would be an exception and mechanical harvesting would be allowed on slopes up to 45 percent (see map 2 in Appendix A, IDF in Appendix B). Whole-tree yarding would be used when possible. Hand treatments

would occur within these units in areas where equipment cannot be used such as in rocky or steep slopes and streamside areas. Follow up hand treatment or mastication would also occur post-mechanical treatment to cut non-merchantable trees. Hand treatments include felling trees less than 30 inches DBH, lopping and scattering or piling and later burning. Activity generated landing slash would be machine piled and burned or chipped and hauled to a biomass facility.

Within treatment areas, trees 30 inches DBH and larger would be retained within the limits of safety and operability. Any of these larger trees that are felled for safety and operability would be left on site for wildlife and other resource considerations. Trees 30 inches DBH and larger that are cut for establishment of new roads would be removed and not left on site. New maintenance level 2 road construction would affect approximately 0.6 acres comprised of mixed conifer and white fir CWHR size and density classes 4M and 4D. Trees 30 inches DBH and larger would be avoided within the limits of safety and engineering needs. Existing non-system routes would also be used for product removal. Non-system routes are currently clear of trees and vegetation except for recent seedling and shrub ingrowth. Any new temporary road construction would avoid trees 30 inches DBH and larger within the limits of safety and engineering needs.

Trees that are suppressed, of considerably poor health, or appreciably diseased would be removed in favor of retaining healthy trees, unless otherwise retained for wildlife value. Healthy, shade-intolerant pine (ponderosa, sugar, and Jeffrey) and Douglas-fir would be favorably retained over shade-tolerant white fir trees and fire-intolerant lodgepole pine.

Mechanical thinning in mixed conifer and true fir CWHR types 4M, 4D, and 5M (there are no California Wildlife Habitat Relationship (CWHR) size and density classes 5D and 6 stands in the project area) would retain 40 percent of existing basal area and 40-50 percent canopy cover making sure to avoid reduction of canopy cover by more than 30 percent.

In east-side pine (Jeffrey and ponderosa pine) CWHR 4M and 4D, 30 percent of existing basal area would be retained. Post-treatment canopy cover would average 25-30 percent.

Approximately 97 percent of the meadow ecotone treatment acres are lodgepole pine type and would be thinned to approximately 20 percent canopy cover. Heavier thinning would occur where understory riparian vegetation exists.

Post-treatment densities would range from 60 to 160 square feet of basal area per acre and up to 200 basal area in true fir stands.

Clumps would range in size from 5 to 10 trees up to 1/4 of an acre and cover up to 15 percent of each proposed treatment unit. They would be comprised of intermediate to large dominant, codominant trees,—preferably shade-intolerant conifers depending on species composition—with generally higher basal area and canopy cover than stand “average.” Trees in clumps would incorporate wildlife habitat trees (e.g. those with forks, crooks, existing cavities, brooms, nests and snags) and have interlocking crowns. In addition, ladder fuels would be removed to reduce potential torching. The desired residual canopy cover of clumps would remain above 50 percent. The treatment would retain clumps in irregular shapes.

Openings would vary in size from 3 to 5 trees up to 1/4 of an acre and cover up to 15 percent of each proposed treatment unit. Treatment would expand or enhance existing openings dominated by desired conifer regeneration and create additional openings around or adjacent to dominant or codominant shade-intolerant conifers, desired seed sources, legacy trees or clumps of these trees (trees generally larger than 24 inches DBH). In addition, the treatment would utilize shrub species as anchor points for the creation of openings, as well as establish openings where the existing structure is generally uniform and lacks structural diversity. The treatment would create openings with irregular shapes.

Matrix thinning would create variable tree spacing and densities. Healthy, fire resistant shade-intolerant conifers (pine species, Douglas-fir) within all size class would be preferentially retained along with scattered shade-tolerant trees. Thinning would occur through all size classes less than 30 inches DBH but would focus on removing smaller diameter and suppressed and intermediate trees, as well as trees of poor health and vigor. Canopy cover would range from 25-60 percent (depending on existing conditions), averaging approximately 40-50 percent across the treatment unit in mixed conifer and true fir CWHR 4M and 5M types. Increased tree removal would be conducted around fire-resistant legacy trees (generally greater than 24 inches DBH) to provide protection from torching, along with the release of hardwood species, shrub species and understory vegetation.

Follow-up treatments would include grapple piling, mastication, hand thinning, hand piling and/or underburning when needed to meet project objectives.

Down woody material would be retained in the largest size classes, in decay classes 1, 2, and 3 (bole shape is round and intact and on or above the ground) would be emphasized.

Piling operations would occur where predicted surface fire behavior exceeds desired conditions. Generally, down woody surface fuels 3 inches in diameter or less would be less than 5 tons per acre. Surface fuels 3 inches in diameter and larger would be reduced to 15 tons per acre. Surface fuel 12 inches in diameter and larger would be favorably retained over smaller material. Activity-generated and existing surface fuels would be piled using a machine with a grapple style attachment or a dozer fitted with a brush rake.

Hand Thinning

Approximately 291 acres in upland forest type are proposed to only be hand thinned with Alternative 1. Units proposed hand thinning include unit 9 (16 acres) which averages slopes greater than 35 percent and units 141, 159, 426 and 427 (275 acres) in the Jennie Mountain and Ginger Peak northern goshawk protected activity centers (PAC). Hand treatment would focus on removing trees that are ladder fuels to larger trees. Trees generally up to 12 inches DBH would be thinned, piled and piles burned.

Hand thinning smaller diameter, ladder fuel trees would reduce the risk of tree torching during prescribed and wildfire events. Overall reduction of canopy cover would be approximately 0-5 percent and would be designed to retain a minimum of 50 percent canopy cover across the treatment units.

Powerline Thinning

A Pacific Gas and Electric (PG&E) transmission line bisects the southern end of the project area, passing through predominantly upland forest stands in the following treatment units; U-150, 153, 166, 167, 172, 173, 182, 302 and 303 (see map 2 of 4 Appendix A). Within 300 ft of the center line both live and dead fuels would be treated in excess of the surrounding units to reduce the risk of damage to the transmission lines resulting in loss of power or a source of ignition for a wildland fire. Two stand improvement treatments are proposed within this area: Removal of hazardous vegetation within 40 feet of center line and thinning of conifers growing within 40 to 300 feet of center line.

Within 40 feet on either side of the center line, all incompatible vegetation would be marked for removal. Incompatible vegetation is that which is undesirable, unsafe, or interferes with the intended use of the site. This includes any vegetation that can grow to a height that encroaches into PG&E's minimum vegetation clearance distances, presents a fire hazard, impedes access or obscures the inspection of equipment. In addition, vegetation would be marked for removal that may pose a hazard to the lines within the next five years from grow-in or fall-in. Additional trees and other vegetation may also be marked for removal if they pose a potential threat to the safety or reliability of the line at any time in the future. Well-spaced, healthy vegetation could be left, based on the professional judgment of the inspector that the vegetation would not be a hazard to the lines in the foreseeable future.

Within the area from 40 to 300 feet of the transmission centerline, trees would be thinned to reduce stand density for forest health and reduce risk of high-severity wildland fire. The specific elements of the proposed thinning within 300 feet of line are as follows;

- *Stands would be thinned* to a target basal area of 40 to 60 square feet per acre.
- *Trees determined to be a hazard to the powerline would be cut regardless of size.*
- Ground-based logging equipment would be used to remove commercially viable material saw-logs and biomass. Non-commercial trees would be thinned and piled on site.
- In areas inaccessible to ground-based machines, hand thinning may occur.
- All hardwood trees, as well as conifer trees greater than 29.9 inches in diameter at breast height (DBH) would not be cut unless they pose a hazard to the power line.
- Trees would be favored for retention in this order: healthy sugar pine, ponderosa/Jeffrey pine, Douglas-fir, incense-cedar, white fir, lodgepole pine.

Thinning treatments, on their own, may be ineffective at reducing fire hazard in stands with high fuel loads. As a result, surface, ladder, and activity fuels will be treated within 300 ft of the center line using a combination of methods, including pile and burn, mastication, and chipping. Removal by chipping and hauling for biomass is the preferred fuel treatment method because of the need to reduce surface fuels, but the others may be used where chip-van access is limited.

Powerline treatments would occur within approximately 156 acres of eastside/Jeffrey pine and 13 acres of mixed conifer forest types, as well as 19 acres of montane chaparral and 5 acres of riverine habitat types. Post treatment canopy cover would average approximately 20 to 30 percent where it currently exists. Canopy cover in the mixed conifer forest type (unit 150 CWHR 4M) would be averaged with the rest of the unit to retain a minimum of 40 percent canopy cover throughout.

Treatment B and C (Aspen and Riparian Hardwood Enhancement / Meadow Restoration)

Aspen and Riparian Hardwood Enhancement

A combination of mechanical and/or hand thinning would be used to treat approximately 630 acres for aspen and riparian hardwood enhancement under Alternative 1 (see Table 1). There are approximately 74 aspen stands in 23 treatment units within the Robbers Creek project area. To enhance the growing conditions and increase sunlight for aspen and other riparian hardwoods, competing and overtopping conifer trees would be removed. Treatment would include hand thinning, hand piling, dry season mechanical treatment and over-snow mechanical treatment. Aspen treatments would occur within 200 feet of delineated aspen stands to allow more sunlight to reach stands and allow for stand expansion. Approximately 118 acres of aspen stands (within 614 acres treatment units) would be treated along with an additional 16 treatment acres for other riparian hardwoods (cottonwood, willow).

Some conifers would be retained in aspen areas at densities between 20-60 square feet of basal area. Conifers would be retained using the following indicators: fire tolerant species, presence of fire scars, and proximity to old stumps/snags/or logs, where they do not impede the growth of aspen or riparian hardwoods and would provide future coarse woody debris input to streams. The largest conifers would be preferentially selected for retention and where they occur in clumps or groups. All snags would be retained within these areas, within the limits of safety and operability. Where aspen and riparian hardwood treatments occur along Robbers Creek, conifers would be retained to contribute to the long-term recruitment of large wood. Large wood in the stream contributes to the geomorphic function and dynamism of Robbers Creek. Between 5 to 10 percent canopy cover of conifers would be retained where they may contribute to the long-term recruitment of wood in the stream. In addition, some conifers would be hand felled strategically to increase large wood in the stream. Directional placement of trees would occur in reaches deemed deficient in coarse woody debris or where placement of wood would enhance stream bed and bank stability as identified and directed by a watershed or aquatics specialist.

Temporary livestock or wildlife fences would be constructed around aspen stands to protect new shoots that are being heavily browsed until they grow above the browse line (e.g. 5 feet for livestock and 6 feet for wildlife). These fences would be utilized to either deter or exclude livestock or wildlife so that new aspen shoots can establish and recruit into larger size classes. Exact locations would be identified post-implementation after utilization has been determined in each stand.

Meadow Restoration

A combination of mechanical and/or hand thinning would be used to treat approximately 424 acres for meadow enhancement under Alternative 1 (see Table 1). Multiple meadows exist within the project area and most have either conifer encroachment or degraded hydrologic function, or both. In their current condition they are not in a stable state and are unlikely to self-repair. The extent of conifer encroachment has shaded hardwood and understory plants and reduced soil moisture resulting in a decline in the vigor of these important community elements. The decline in the vigor of deep-rooted sedges has reduced stream bank stability resulting in channel incision, further drying the meadows and improving conditions for increased conifer encroachment. This process threatens the resilience of these important wetland features. Large wood is lacking in many reaches and historically played an important role in providing grade control and bank stability in this system.

Within meadows, most or all conifer trees less than 30 inches DBH would be cut and removed. Less than 10 percent conifer canopy cover would be retained to recruit instream large woody debris and help stabilize the stream. After mechanical and hand thinning and pile burning, there would be an increase in the amount of sunlight available for understory vegetation. Swanson et al. (2007) found that conifer removal with and without prescribed fire in dry meadows appeared to benefit meadow species within one year of treatment. “Results from the Leaky Louie meadow enhancement on the [Eagle Lake Ranger District (Lassen National Forest)] showed that understory richness increased following thinning and burning treatments (Jones 2013).”

Hand thinning trees within hand-thin only meadow units may occur over multiple entries to achieve desired conditions. Unit 538 (8 acres) would exclude mechanical treatment, piles and pile burning because of the Region sensitive plant species *Castilleja lasenensis*. Hand thinning would be permitted within the occurrences. The thinned material would be lopped and scattered or piled 25 feet from the plants. Unit 536 (3 acres) would only be hand thinned because of its proximity to the Jennie Mountain northern goshawk protected activity center (PAC) and to avoid logging activity (landings and skid trails) in the PAC. Unit 520 (30 acres) would be hand thinned to provide large, woody debris to Robbers Creek and to avoid detrimental effects from mechanical treatment. Approximately 4 acres of meadow unit 520 is typed as Jeffrey pine conifer type and the remaining 26 acres are typed as riparian shrub or wet meadow that does not need conifer removal.

Table 10 shows CWHR types immediately post treatment and over a 20-year timeframe. Overall, there would be an increase in aspen and wet meadow CWHR types because of conifer tree thinning. Table 11 displays the CWHR habitat types for aspen, riparian hardwood and meadow treatments pre- post- and 20 years post-thinning for Alternative 1. Table 12 displays Alternative 1 pre- and post-treatment acres by proposed treatment type and CWHR habitat in the Robbers Creek project area.

Table 10. Existing, post-treatment, and 20 years post-treatment acres of CWHR size and density classes for upland forests within the Robbers Creek project area for Alternative 1.

| CWHR Size and Density Class/Veg Type | Existing Acres* | Percent of Treatment Acres | Post- treatment Acres | Percent of Treatment Acres | Acre Changes Post- treatment | 20 Years Post- treatment Acres | Percent of Treatment Acres | Acre Changes 20 Year Post- treatment | Size Class Summary | Density Class Summary |
|---|----------------------------|---|--------------------------------------|---|---|---|---|---|-------------------------------|----------------------------------|
| 2S | | | | | 0 | 3 | 0 | 3 | <i>Size Class 2</i> | <i>Density Class S</i> |
| 2P | 6 | 0 | | | -6 | | | -6 | Existing = 8 | Existing = 21 |
| 2M | 2 | 0 | | | -2 | | | -2 | Post = 0 | Post = 264 |
| 2D | | | | | | | | | 20 years = 3 | 20 years = 3 |
| 3S | 9 | 0 | 16 | 1 | 7 | | | -9 | <i>Size Class 3</i> | <i>Density Class P</i> |
| 3P | 7 | 0 | 4 | 0 | -3 | 15 | 1 | 8 | Existing = 220 | Existing = 172 |
| 3M | 191 | 8 | 0 | | -191 | 4 | 0 | -187 | Post = 20 | Post = 111 8 |
| 3D | 13 | 1 | 0 | | -13 | | | -13 | 20 years = 19 | 20 years = 119 0 |
| 4S | 12 | 0 | 248 | 10 | 236 | | | -12 | <i>Size Class 4</i> | <i>Density Class M</i> |
| 4P | 146 | 6 | 1101 | 44 | 955 | 1175 | 47 | 1029 | Existing = 219 3 | Existing = 169 8 |
| 4M | 1441 | 58 | 741 | 30 | -700 | 877 | 35 | -564 | Post = 233 6 | Post = 868 |
| 4D | 594 | 24 | 246 | 10 | | 275 | 11 | -319 | 20 years = 232 7 | 20 years = 102 9 |
| 5S | | | | | | | | | <i>Size Class 5</i> | <i>Density Class D</i> |
| 5P | 13 | 1 | 13 | 1 | 0 | | | -13 | Existing = 77 | Existing = 607 |
| 5M | 64 | 3 | 127 | 5 | 63 | 148 | 6 | 84 | Post = 140 | Post = 246 |
| 5D | | | | | | | | | 20 years = 148 | 20 years = 275 |

* Acre totals do not include portions of treatment units typed as non-forest habitat types

Table 11. Alternative 1 CWHR habitat types for aspen, riparian hardwood and meadow treatments pre- post- and 20 years post-thinning.

| Aspen and Riparian Hardwoods (B) | | | | | | | | | | | | | | |
|----------------------------------|-----|-------|------|-----|--|--------------------------------|---------------|----|-----|--|---------------------------------------|--|----------------------------------|-------|
| Pre | | | Post | | | | 20 years Post | | | | | | | |
| | | | | | Acreage Change Post Treatment | % Change pre and post | | | | Acreage Change 20 years post Treatment | % change post and 20 post | Acreage Change pretreatment to 20 years post | % Change pre to 20 post | |
| CWHR | Ac | % | | Ac | % | | | Ac | % | | | | | |
| SMC | 332 | 52.7% | | 208 | 33.1% | -123.6 | -37% | | 14 | 2.3% | -194 | -93% | -525.4 | -258% |
| EPN | 147 | 23.4% | | 201 | 31.9% | 53.6 | 36% | | 82 | 13.1% | -119 | -59% | -266.1 | -280% |
| JPN | 0 | 0% | | 80 | 12.7% | 80.3 | | | 0 | 0% | -80 | -100% | -80.3 | |
| PPN | 0 | 0% | | 5 | 0.8% | 5.1 | | | 0 | 0% | -5 | -100% | -5.1 | |
| LPN | 84 | 13.4% | | 37 | 5.9% | -47.4 | -56% | | 2 | 0.3% | -35 | -94% | -118.9 | -241% |
| MCP | 26 | 4.1% | | 26 | 4.1% | 0 | 0% | | 25 | 4.0% | -1 | -3% | -26.5 | -203% |
| MHC | 0 | 0% | | 11 | 1.7% | 10.8 | | | 443 | 70.4% | 432 | 3989% | 432.4 | |
| ASP | 0 | 0% | | 13 | 2.1% | 13.2 | | | 22 | 3.5% | 9 | 67% | 8.8 | |
| RIV | 26 | 4.1% | | 26 | 4.1% | 0 | 0% | | 26 | 4.1% | 0 | 0% | 0 | 0% |
| MRI | 5 | 0.9% | | 14 | 2.1% | 8.1 | 150% | | 5 | 0.9% | -8 | -60% | -13.5 | -350% |
| URB | 1 | 0.2% | | 1 | 0.2% | 0 | 0% | | 1 | 0.2% | 0 | 0% | 0.0 | 0% |
| BAR | 8 | 1.2% | | 8 | 1.2% | 0 | 0% | | 8 | 1.2% | 0 | 0% | 0.0 | 0% |
| Meadows (C) | | | | | | | | | | | | | | |
| Pre | | | Post | | | | 20 years Post | | | | | | | |
| | | | | | Acreage Change Post Treatment | % Change pre and post | | | | Acreage Change 20 years post Treatment | % Change post and 20 post | Acreage Change pretreatment to 20 years post | % Change pre to 20 post | |
| CWHR | Ac | % | | Ac | % | | | Ac | % | | | | | |
| JPN | 4 | 0.6% | | 9 | 1.5% | 4.9 | 129% | | 5 | 0.8% | -4 | -44% | 1.1 | 29% |
| LPN | 259 | 43.4% | | 31 | 5.3% | -227.5 | -88% | | 29 | 4.9% | -2 | -7% | -229.9 | -89% |
| SMC | 13 | 2.2% | | 2 | 0.3% | -11.0 | -86% | | 4 | 0.6% | 2 | 108% | -9.1 | -70% |
| MRI | 85 | 14.2% | | 85 | 14.2% | 0 | 0% | | 85 | 14.2% | 0 | 0% | 0 | 0% |
| WTM | 237 | 39.7% | | 458 | 76.6% | 220.4 | 93% | | 462 | 77.3% | 4 | 1% | 224.6 | 95% |
| ASP | 0 | 0% | | 13 | 2.2% | 13.3 | | | 13 | 2.2% | 0 | 0% | 13.3 | 0% |

Treatment D - Prescribed fire

In Alternative 1, prescribed fire would occur as a stand-alone treatment in some stands (973 acres, including 47 acres of Goshawk PAC) and as a follow-up treatment in others (3,573 acres). After mechanical and hand thinning treatments in upland forests, aspen stands and meadows, underburning would be used to promote snag development and promote shade-intolerant species like ponderosa and Jeffrey pine while reducing species less resilient to fire like white fir and lodgepole pine. Soil exposed during aspen and meadow treatments would provide a seed bed for conifer seedlings. Prescribed underburning would consume surface fuels and kill encroaching conifer seedlings. Integrated design features address resource protection measures in areas where high intensity fire is undesirable. In these areas direct ignition would be excluded, however fire would be allowed to move into these areas on its own. In areas of the project that currently meet desired ladder and crown fuel conditions, prescribed underburning would be a stand-alone treatment to maintain those conditions.

Table 12. Alternative 1 pre- and post-treatment acres by proposed treatment type and CWHR habitat in the Robbers Creek project area.

| Treatment | CWHR | Pre-Treatment (Acres) | Post-Treatment (Acres) |
|------------------------------------|-------|-----------------------|------------------------|
| RxA Mechanical Thin | EPN4D | 7 | 0 |
| | EPN4M | 632 | 0 |
| | EPN4P | 75 | 742 |
| | EPN4S | 7 | 42 |
| | JPN4M | 8 | 0 |
| | JPN4P | 0 | 11 |
| | LPN2P | 2 | 0 |
| | LPN3D | 13 | 0 |
| | LPN3M | 93 | 7 |
| | LPN3P | 7 | 0 |
| | LPN3S | 3 | 5 |
| | LPN4M | 182 | 7 |
| | LPN4P | 18 | 282 |
| | LPN4S | 0 | 22 |
| | PPN3S | 6 | 6 |
| | SMC2M | 2 | 0 |
| | SMC3M | 28 | 0 |
| | SMC3P | 0 | 4 |
| | SMC4D | 171 | 0 |
| | SMC4M | 335 | 607 |
| | SMC4P | 46 | 50 |
| | SMC4S | 1 | 0 |
| | SMC5M | 58 | 93 |
| | SMC5P | 13 | 13 |
| | WFR4D | 173 | 0 |
| | WFR4M | 124 | 89 |
| | WFR5M | 0 | 28 |
| | BAR | 3 | 6 |
| | MCP | 33 | 33 |
| | PGS | 2 | 2 |
| | URB | 12 | 12 |
| RxA Meadow Ecotone Mechanical Thin | LPN2P | 4 | 0 |
| | LPN3M | 67 | 0 |
| | LPN3S | 0 | 4 |
| | LPN4M | 120 | 0 |
| | LPN4P | 7 | 14 |
| | LPN4S | 0 | 180 |

| Treatment | CWHR | Pre-Treatment (Acres) | Post-Treatment (Acres) |
|---|---------------------------------|-----------------------|------------------------|
| | SMC3M | 3 | 0 |
| | SMC4D | 2 | 0 |
| | SMC4M | 0 | 2 |
| | SMC4P | 0 | 3 |
| | PGS | 2 | 2 |
| RxA Hand Thin | LPN4S | 4 | 4 |
| | WFR4M | 6 | 6 |
| | WFR5M | 5 | 5 |
| | SMC4D (PAC) | 246 | 246 |
| | SMC4M (PAC) | 30 | 30 |
| RxB Aspen Enhancement Mechanical Thin | ASP3S (aspen) | 0 | 13 |
| | MHC (mixed hardwood/conifer) | 0 | 11 |
| | MRI4S (riparian hardwood trees) | 0 | 9 |
| | EPN4M | 57 | 0 |
| | EPN4P | 81 | 0 |
| | EPN4S | 10 | 165 |
| | EPN5S | 0 | 27 |
| | JPN4S | 0 | 69 |
| | JPN5S | 0 | 11 |
| | LPN3P | 2 | 0 |
| | LPN3S | 0 | 2 |
| | LPN4D | 11 | 0 |
| | LPN4M | 44 | 0 |
| | LPN4P | 19 | 0 |
| | LPN4S | 8 | 6 |
| | LPN5S | 0 | 29 |
| | SMC4D | 54 | 0 |
| | SMC4M | 233 | 0 |
| | SMC4P | 24 | 0 |
| | SMC4S | 5 | 126 |
| | SMC5P | 0 | 5 |
| | SMC5S | 0 | 71 |
| | BAR | 8 | 8 |
| | MCP | 25 | 25 |
| | MRI (riparian shrub) | 5 | 5 |
| | RIV | 25 | 25 |
| | URB | 1 | 1 |
| RxB Aspen Enhancement Hand Thin | MCP | 1 | 1 |
| RxB Riparian Hardwood Enhancement Mechanical Thin | EPN4P | 0 | 8 |
| | SMC4D | 2 | 0 |
| | SMC4M | 13 | 5 |
| | SMC5M | 0 | 2 |
| | RIV | 1 | 1 |
| RxC Meadow Restoration Mechanical Thin | WTM (wet meadow) | 43 | 259 |
| | ASP (aspen) | 0 | 13 |
| | JPN5S | 0 | 5 |
| | LPN3M | 30 | 0 |
| | LPN3S | 1 | 0 |
| | LPN4M | 162 | 20 |
| | LPN4P | 23 | 0 |
| | LPN4S | 37 | 4 |
| | LPN5S | 0 | 4 |
| | SMC4M | 11 | 0 |
| | SMC4P | 2 | 0 |

| Treatment | CWHR | Pre-Treatment (Acres) | Post-Treatment (Acres) |
|----------------------------------|----------------------|-----------------------|------------------------|
| RxC Meadow Restoration Hand Thin | SMC4S | 0 | 2 |
| | MRI (riparian shrub) | 75 | 75 |
| | JPN4M | 4 | 4 |
| | LPN4M | 3 | 0 |
| | LPN4S | 4 | 3 |
| | MRI | 8 | 8 |
| RxD Underburn Only including PAC | WTM | 22 | 26 |
| | EPN4M | 47 | 47 |
| | EPN4P4,745 | 674 | 674 |
| | LPN4P | 45 | 45 |
| | SMC2S | 54 | 54 |
| | SMC4P | 97 | 97 |
| | SMC5M | 5 | 5 |
| | SMC5S | 8 | 8 |
| | BAR | 4 | 4 |
| | MCP | 15 | 15 |
| | PGS | 6 | 6 |
| | URB | 17 | 17 |

ASP=aspen; BAR=barren; EPN = eastside pine; JPN=Jeffrey pine; LPN=Lodgepole Pine, MCP=montane chaparral; MHC=mixed hardwood/conifer; MRI=montane riparian; PGS=perennial grassland; PPN=ponderosa pine; RIV=riverine; SMC=Sierra mixed conifer; URB=urban; WFR=white fir; WTM=wet meadow;

Alternative 2 (No Action)

Direct and Indirect Effects

Under Alternative 2, the no action alternative, existing stand conditions would persist and develop unaltered by active management. Current management practices and ongoing activities such as fire suppression, grazing, road and trail maintenance, fuelwood and Christmas tree cutting, and recreation use would continue. Wildfire, drought, disease, and insect-related mortality and recruitment would continue to occur. Stands would remain dense, particularly in the smaller diameter classes in terms of trees per acre, basal area and stand density index. The existing stand structure promotes a low light environment, favoring the regeneration, growth, and development of shade-tolerant species. There is currently little opportunity for the naturally dominant pine species to reestablish and regenerate themselves without disturbance or naturally created openings. The Robbers Creek Project area contains high accumulations of ladder fuels and vertical and horizontal continuity of canopy fuels. In combination with high surface fuel loads, these stands are predicted to have increased susceptibility to higher fire intensity and subsequent tree mortality. The high stand densities also increase stress on the larger, more desirable trees due to increased competition among trees for water during extended drought periods. High stand densities also increase the probability of epidemic levels of insect attack and disease infection.

Without a more natural frequent fire regime, the desired stand structure and composition would not be obtained. Fire regime-maintained forests were characterized by low stand densities with larger, fire-resistant tree species intermixed with pockets of tree regeneration and shrubs. Under the no action alternative, stand densification and landscape homogeneity would prevail.

Forest stands would be comprised of low levels of horizontal and vertical diversity at the landscape scale with a decreased proportion of fire-resistant pines. There would be fewer multistoried stands, consisting of

an uneven distribution of size classes due to a high proportion of small trees (North et. al 2009). A lack of heterogenous canopy openings would stifle regeneration of shade-intolerant conifers that compete better under direct sunlight conditions (Helms 1998) and discourage growth of understory plant communities (e.g. grass, forbs, shrubs). Heterogeneity would be decreased or remain stagnant within and among stands which would not allow for individual trees and forest stands to better cope with drought stress, insect infestation, disease outbreaks, or modification of landscape-level fire behavior (by reducing the spread and extent of high severity fire).

Aspen stands would continue to decline due to continued encroachment from neighboring conifer forests that are overtopping aspen by growing around and within them. Regeneration would remain scarce as conifer dominance continues to inhibit existing stand vigor and aspen sprouts from development. Excessive browsing by deer would continue to suppress aspen regeneration and recruitment.

Meadows would continue to be encroached by conifer trees and hydrologic function would continue to degrade. Riparian hardwood species and understory plants would continue to decline in vigor and number because of the drying and shading effects of the overstory conifer canopy.

Failure to achieve the desired condition in the project area would also inhibit the use of prescribed fire across the landscape. Without prescribed fire, the restoration of ecological processes such as opening growing space, providing a flush of soil nutrients, and increasing plant diversity would be limited, while the effects of unplanned fires would go unmitigated. Current stand conditions within the project area are highly unlikely to self-correct to achieve the desired conditions.

Furthermore, Alternative 2 would not remove hazardous vegetation along PG&E powerlines susceptible to grow-in or fall-in. Rather PG&E would continue to identify hazard trees under their Master Special Use Permit and related Operation and Maintenance Plan with the Lassen National Forest on an annual basis rather than a holistic and comprehensive approach under Alternative 1. Existing surface fuel loading from previous PG&E hazard tree operations would not be reduced through pile and pile burn or chipping treatments. On a landscape scale, Table 13 shows existing CWHR vegetation types, size class distribution, and canopy cover distribution for the Robbers Creek Project analysis area. Over 59 percent of the acres in the analysis area are in the moderate to dense canopy cover classes (CWHR density classes M and D), which indicates high levels of interlocking crowns. Approximately 77 percent of the project area is in the small tree size class (CWHR size class 4) which indicates a lack of horizontal diversity.

Table 13. Summary of habitat types, size class distribution, and canopy cover class distribution within the Robbers Creek project area for 2020

| CWHR | Forest Vegetation Data | Total Acres (5,080) | Percent of Total Acres |
|--------------|--|------------------------|------------------------------|
| Habitat Type | Non-timbered (includes wet meadow, grassland, barren, urban) | 684 | 13.5 |
| | Montane Chaparral | 74 | 1.4 |
| | Lodgepole Pine | 913 | 18 |
| | Eastside Pine (ponderosa, Jeffrey) | 1,607 | 31.6 |

| CWHR | Forest Vegetation Data | Total Acres (5,080) | Percent of Total Acres |
|---------------------------------------|--|--------------------------------|---------------------------------------|
| | Sierra mixed conifer | 1,478 | 29.1 |
| | True fir (white and red) | 324 | 6.4 |
| | TOTALS | 5,080 | 100 |
| Size Class Distribution | Miscellaneous (includes wet meadow, grassland, low sage, sagebrush, chaparral) | 757 | 14.9 |
| | 1) Seedling (less than 1-inch DBH) | 0 | 0 |
| | 2) Sapling (1–6 inches DBH) | 62 | 1.2 |
| | 3) Pole (6–11 inches DBH) | 253 | 5.0 |
| | 4) Small Tree (11–24 inches DBH) | 3,919 | 77.1 |
| | 5) Medium/Large Tree (> 24 inches DBH) | 89 | 1.8 |
| | 6) Multi Layered (size 5 over 4 or 3; canopy >60%) | 0 | 0 |
| | TOTALS | 5,080 | 100 |
| Canopy Cover Class Distribution | NA (0–9%) (includes wet meadow, grassland, low sage, sagebrush, chaparral, X canopy closure) | 757 | 14.9 |
| | S) Sparse (10–24%) | 147 | 2.9 |
| | P) Open (25–39%) | 1,145 | 22.5 |
| | M) Moderate (40–59%) | 2,339 | 46.1 |
| | D) Dense (60–100%) | 693 | 13.6 |
| | TOTALS | 5,080 | 100 |

Summary of Cumulative Effects

Alternative 1 would best meet desired conditions for both the fuels reduction and forest health objectives and would enhance forest resiliency to trends presented by climate change.

While treatments under Alternative 1 could enhance structural diversity at the stand level depending on individual stand conditions, the capacity of some treatments to enhance heterogeneity and improve species composition are somewhat limited by the upper diameter limits and canopy cover restrictions associated with the 2004 Sierra Nevada Forest Plan Amendment Record of Decision.

As seen in Table 14 over the 20-year timeframe size overall tree diameters will increase in the upland forest treatment types and stand density classes will become more open and park-like with an increased quadratic mean diameter (QMD).

In both the Aspen and Riparian Hardwood and Meadow treatment areas, Table 14 clearly shows a substantial increase in aspen and wet meadow CWHR types thus restoring the area to historic landscapes.

While the conifer dominated habitat types would decrease from meadow restoration and aspen enhancement, the QMD of residual conifer trees would increase.

Alternative 2 would not meet the purpose and need to restore aspen, meadows, or riparian areas nor reduce hazardous fuel accumulations to improve forest health and increase public safety. The existing forest and landscape structure could lead to a greater potential for large, high-severity fires in forested areas, riparian conservation areas, and northern goshawk protected activity centers in the project area during a wildfire under severe weather conditions.

Alternative 2 would rely on continued fire exclusion, density, insect and disease dependent mortality, and unanticipated wildfires to shape overall landscape structure. High stand densities and closed-canopy forests would favor a gradual shift in vegetation composition toward shade-tolerant vegetation species, which would have an adverse effect on species diversity across the landscape. Over the long term, mortality occurring in high-density stands would continue to increase surface fuel loads thereby increasing fire severity over time and resulting in high mortality events.

Indicators of forest health and fire-resistant stand structure were used to assess the effects of the proposed action on vegetation. Stand density as characterized by trees per acre, basal area, stand density index, and relative density (percent of maximum stand density index) were used as metrics of forest health. Fire resistant stand structure was assessed with respect to distribution of trees per acre, canopy cover by diameter size classes, species composition, and landscape structure (i.e., CWHR vegetation types, size classes, and density classes).

Table 14. Summary of effects on forest health and stand structure indicators by alternative.

| Treatment Types | Condition | Trees Per Acre | Basal Area (ft ² per acre) | Stand Density Index | Percent of Maximum Stand Density Index | Quadratic Mean Diameter (inches) | Canopy Cover (percent) |
|------------------------------------|------------------------------|----------------|---------------------------------------|---------------------|--|----------------------------------|--|
| Upland Forests Mechanical Thin (A) | EPN Alternative 2 (Existing) | 360 | 132 | 203 | 51 | 15.4 | 42 |
| | EPN Alternative 1 | 65 | 79 | 113 | 30 | 17.8 | 27 |
| | LPN Alternative 2 (Existing) | 853 | 156 | 282 | 43 | 11.5 | 43 |
| | LPN Alternative 1 | 96 | 79 | 120 | 20 | 13.9 | 26 |
| | SMC Alternative 2 (Existing) | 915 | 238 | 373 | 52 | 15.8 | 50 (CWHR 4M, 4D and 5M) 39 (all other CWHR) |
| | SMC Alternative 1 | 100 | 141 | 191 | 29 | 18.7 | 40 (CWHR 4M and 5M) 28 (all other CWHR) |
| | WFR Alternative 2 (Existing) | 832 | 283 | 427 | 57 | 16.1 | 55 |

| Treatment Types | Condition | Trees Per Acre | Basal Area (ft ² per acre) | Stand Density Index | Percent of Maximum Stand Density Index | Quadratic Mean Diameter (inches) | Canopy Cover (percent) |
|--|--------------------------|----------------|---------------------------------------|---------------------|--|----------------------------------|------------------------|
| | WFR Alternative 1 | 99 | 151 | 203 | 30 | 18.9 | 40 |
| Upland Forest Hand Thin (A) | Alternative 2 (Existing) | 797 | 274 | 454 | 57 | 13.1 | 58 |
| | Alternative 1 | 289 | 245 | 382 | 48 | 13.5 | 56 |
| Upland Forest Meadow Ecotone (A) | Alternative 2 (Existing) | 1,269 | 191 | 353 | 52 | 11.0 | 49 |
| | Alternative 1 | 84 | 65 | 100 | 15 | 13.7 | 21 |
| Aspen Enhancement (B) | Alternative 2 (Existing) | 706 | 174 | 273 | 51 | 15.3 | 45 |
| | Alternative 1 | 154 | 42 | 57 | 13 | 23.1 | 13 |
| Riparian Hardwoods (B) | Alternative 2 (Existing) | 1477 | 220 | 349 | 57 | 14.2 | 52 |
| | Alternative 1 | 281 | 104 | 153 | 28 | 16.9 | 30 |
| Meadow Enhancement (C) | Alternative 2 (Existing) | 1,2891,151 | 190 | 330 | 52 | 12.7 | 46 |
| | Alternative 1 | 70 | 16 | 25 | 4 | 29.2 (where trees are retained) | 5 |
| Underburn Only (D) | Alternative 2 (Existing) | 140 | 104 | 158 | 35 | 17.9 | 31 |
| | Alternative 1 | 72 | 91 | 136 | 32 | 18.3 | 29 |
| Source: Robbers Creek Watershed Restoration Project data modeled with Forest Vegetation Simulator program, Almanor Ranger District. Note: EPN=east side pine, LPN=lodgepole pine, SMC=Sierra mixed conifer, WFR=white fir; Averages were calculated for the CWHR tree dominated habitats; shrub, herbaceous and non-vegetation dominated habitats (e.g. MCP, MRI, WTM, BAR) were excluded from the averages. | | | | | | | |

Economics

The social and economic environment of the Lassen National Forest is described in the Forest's 1993 Land and Resource Management Plan as amended by the 2004 Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision. This economic analysis is not designed to model all economic factors used in an intensive and complex timber sale appraisal process. Rather it takes a less complex but consistent and systematic approach to display the relative differences in financial efficiency (i.e. relevant revenues and costs) for the alternative. Calculations do not include costs and values for those items that cannot be easily estimated such agency administration and overhead. The analysis does not include non-priced benefits such as improved watershed or habitat conditions, control of noxious weeds, and reduced fire hazard.

In Alternative 1, the proposed action, treatments would be implemented utilizing commercial timber sales, stewardship contracts, service contracts and the work of Forest Service and partner personnel. Timber harvest values utilized for this analysis are a three-year average of the value of similar sold timber sales on the forest. Timber volume estimates are based on modeling of stand exam data in the Forest Vegetation Simulator Growth and Yield Model program. Cost of mechanical fuels treatment, fencing, hand thinning

and prescribed fire are based on recent service contract prices and Knutson-Vandenberg (K-V) sale area improvement plans. Non-timber sale treatments would be funded in part from the project's timber sale receipts.

Table 17 displays the amount of merchantable timber that would be removed from the Robbers Creek project and the value of the timber. Table 15 displays estimated costs for non-timber sale treatments.

Table 15. Alternative 1 estimated total timber yield and value

| Product | Total Volume (CCF) | Total Value (American Dollars) |
|------------------------------------|--------------------|--------------------------------|
| Sawtimber (10.0-29.9 inches DBH) | 52,447 | |
| Non-Sawtimber (3.0-9.9 inches DBH) | 20,688 | |
| | | \$3,487,100 |

Table 16. Alternative 1 non-timber sale treatments

| Treatment and Acres* | Total Future Costs |
|---|--------------------|
| Hand thin and pile only stands (302 acres) | \$135,296 |
| Install aspen fence (118 acres) | \$68,870 |
| Post-harvest hand thin and pile aspen and meadows (854 acres) | \$536,510 |
| Post-harvest machine grapple pile (2,239 acres) | \$1,425,600 |
| Decommission Forest System Roads (0.5 miles) | \$1,460 |
| Obliterate non-system route (10.8 miles) | \$15,780 |
| Pile burn (3,395 acres) | \$337,350 |
| Underburn (4,000 acres) | \$397,470 |
| Total | \$2,918,336 |

* estimated acres do not include non-forest vegetation types

Alternative 1 shows the potential for a positive benefit-to-cost ratio where the cost of service contract work is less than the value of the timber removed. It is estimated that approximately 30 percent of the total volume removed would be lodgepole pine. A portion of those units, mostly meadow ecotone treatment, may be sold as commercial fuelwood. Approximately 16 percent of the volume removed would be from mechanical meadow treatment units. Mechanical treatment would only occur when soil is dry to a depth of 10 inches (see IDFs, Appendix B). It is anticipated that some portions of the meadows would be too wet for mechanical treatment and mechanical treatment would be dropped. Post-harvest treatments would only occur where needed as determined after logging and actual acres may be less (or more) than shown in Table 17.

Table 17. Alternative 1 total volume removed by mechanical thin treatment type and forest habitat type

| Treatment Type | Total Volume Removed (CCF) | Volume Removed (percent) | Forest Habitat Type | Total Volume Removed (CCF) | Volume Removed (percent) |
|------------------------|----------------------------|--------------------------|---------------------|----------------------------|--------------------------|
| RxA Upland Forest | 38,451 | 53 | East-side pine | 10,741 | 15 |
| RxA Meadow Ecotone | 5,502 | 8 | Jeffrey pine | 261 | 0 |
| RxB Aspen Enhancement | 17,235 | 24 | Lodgepole pine | 22,602 | 31 |
| RxB Riparian Hardwood | 465 | 1 | Mixed conifer | 29,063 | 40 |
| RxC Meadow Restoration | 11,482 | 16 | White fir | 10,468 | 14 |

Alternative 1 would result in a positive effect on local industries that depend on service contracts or a steady supply of forest products. The local economy would receive benefits from associated employment

such as in food, lodging, and transportation businesses. There would be an economic return of money to the community from associated harvesting activities, processing and sale of forest products and from service contracts awarded to complete post-harvest treatments. Alternative 1 would have a positive effect on maintaining local infrastructure that is imperative to implementing future restoration and fuels reduction projects. The alternative would provide opportunities for long-term employment and rural community stability because it is anticipated that harvest and service contract work would continue in the project area for 5 to 10 years.

Alternative 2, no action, would have no economic benefit.

Soils

Environmental Consequences

Alternative 1 – Proposed Action

Direct and Indirect Effects

Within mechanically thinned areas, units as a whole are expected to retain greater than 50 percent soil cover, well-distributed throughout. Though skid trails would have reduced levels of soil cover compared to the surrounding areas, erosion-prevention measures on skid trails are incorporated in the proposed action. The extent of porosity loss (soil compaction) on landings and skid trails would be minimized by the judicious re-use of existing skid trails and landings, and by adhering to soil moisture standards. Post-project soil monitoring and possible remediation is specified in the project integrated design features. Except for portions of landings and the first few hundred feet of main skid trails, a measurable loss of soil organic matter would not be expected. Where losses occur, they are anticipated to be within the defined LRMP soil standard in terms of areal extent, and litter and duff will continue to exceed the LRMP standard of 50 percent areal extent. The Robbers Project area is variably stocked with large woody material but generally below the standard of 5 logs per acre. An integrated design feature for the project stipulates that, where they exist, a minimum of five logs per acre will be left in place. Other than down logs per acre, based on past projects with similar treatments on similar soils, with integrated design features (IDFs) in place, it is expected that these standards will be met.

The proposed action includes mechanical tree removal and piling of conifers encroaching into 597 acres of meadow habitat. Meadow soils have a high risk of rutting and compaction due to finer soil textures, low rock content, slow drainage rates, and high-water tables. In meadows, compaction not only can cause reduced water infiltration rates and root penetration but can also impact subsurface hydrology. Due to the increased risk of undesired impacts to meadow soils, an IDF requiring soils in meadows to be drier than upland soils is part of the proposed action.

Restoration of the meadow hydrology in Swain Meadow will reduce the ongoing, chronic erosion of meadow soils caused by down cutting and widening of the stream channel. The fill to be used in the restoration work will preferably be from stockpiled material left from a nearby road construction project, but if necessary, some soil will be taken from a Lodgepole stand approximately a half-mile east of Swain Meadow. If soil is taken from the lodgepole stand it needs to be done in way that will not render the site unproductive, with consultation by a soil scientist.

The direct effect of underburning would be an immediate reduction in cover, possibly below the standard. However, this would be short-lived, and cover would be reestablished in one or two years. Needlecast immediately after the burn would provide some cover. Throughout the areas where conifers are removed, grasses, forbs, and low-growing shrubs would have access to more resources (light, water, and nutrients) enabling them to grow and spread, providing additional live soil cover. Underburning would not impact soil porosity since it does not involve using heavy equipment. Prescribed fires are designed to leave some residual duff to protect the mineral soil and maintain high infiltration rates, which minimizes potential for erosion, though there would be a net loss in litter and duff. This temporary loss of litter and duff would be restored over a short time period, 2 to 3 years, with new needlecast. After conifer removal in the meadow areas, grasses and forbs would replace pine litter as the dominant soil cover. Recent monitoring of underburning on the Lassen NF showed that underburning resulted in a mosaic pattern of burned and unburned forest floor with substantial forest cover consisting of partially burned litter and duff, rock, unburned vegetation and woody debris, leaving about 5% of the surface as bare soil (Peters 2019).

Piling of fuels will be done by excavator-mounted grapple, tractors fitted with brush rakes, or by hand. Hand piling has little potential for detrimental soil effects so only machine piling effects are considered here. Excavator-mounted grapples create minimal soil disturbance because the machines have low ground pressure and they lift material from the soil surface. However, the risk of a loss of soil organic matter can be high with tractor piling because there is a potential to move soil into burn piles when using brush rakes. But since the fuel's objective is to avoid having soil in burn piles so the pile material can burn, the risk is reduced and there is an IDF that limits the amount of material removed and piled.

Recent research has shown that pile burning in the Sierra Nevada can have limited detrimental effects on soils (Busse, et al, 2014). This is due to both the limited area of soil surface covered in piles and the fact that high soil heating is concentrated near the center of the pile. Piles consisting of small or mixed fuel sizes generally will not produce adverse soil heating effects. However, where fuels are predominately large diameter wood (>25 cm) temperatures in the center of the pile will be hot enough to consume the soil organic matter in the upper few inches. The IDF that requires leaving 10 to 15 tons of logs greater than 30cm will help prevent piles with predominately large diameter wood. Burn piles in one recent study in Sierra Nevada thinning units occupied about 8% of the soil surface, limiting the area of soil covered by burn piles and reducing the potential detrimental effect to acceptable levels. (Busse, et al, 2014)

The Land and Resource Management Plan for LNF directs the Forest to avoid tractor logging on slopes over 35%. One unit in the Robbers project, Unit 144, is desirable to treat on pitches up to 45% slope. Field observations showed that past logging impacts were light to moderate, and the area of slope between 35 and 45% is limited to about 20 acres. It was decided to mechanically harvest this unit up to 45% slope with the stipulation that a qualified watershed specialist be present to ensure soil standards are met.

The proposed action includes a net reduction of about 10.96 miles of non-system and system routes, restoring about 13.3 acres to productive soils.

Cumulative Effects

Ten years of soil monitoring as part of the Herger-Feinstein Quincy Library Group pilot project, which included the Lassen National Forest, has shown that forest thinning operations like those proposed in the Robbers Project, using modern equipment and methods, have a good track record of meeting soil quality standards, except for down logs. (HFQLG, 2011)

Potential impacts of the proposed action on the short-term and long-term soil resource are minimal due to the mitigations (IDFs) that are part of the proposed action. When considered with past and foreseeable activities within the proposed project area, the project has little potential to create impacts of a degree and extent considered detrimental or adverse to the soil resource. Soil resources will benefit from the restoration of meadow hydrology and the decommissioning of unnecessary routes.

Alternative 2 - No Action

Direct, Indirect, and Cumulative Effects

No direct adverse effects on soils would be expected with the No Action alternative but indirect effects could result from continued accumulation of fuels and the increasing risk of high intensity wildfire. High intensity wildfires adversely impact soil resources through combustion of ground cover which leaves extensive areas of bare soil and increases the risk of soil loss by erosion. Combustion of the litter and duff layer, which is the forest's nutrient reservoir, leads to reduced long-term productivity. High intensity wildfires can also adversely impact the soil's hydrologic function by creating a hydrophobic layer, and by reducing soil organic matter and stable aggregates, all of which can lead to lower water infiltration rates, increased erosion risk, and reduced soil water availability.

Rangeland

Environmental Consequences

Alternative 1 – Proposed Action

Direct and Indirect Effects

Rangeland Vegetation (forage availability and condition)

Upland conifer forest restoration activities could beneficially affect conditions in perennial grasslands by reducing conifer density in stands, which can compete with grass and browse plants for sunlight, water, nutrients, and space. This could result in improved forage conditions while openings persist.

Meadow vegetation and transitional areas along the ecotone could also benefit from treatments which could increase sunlight and possible water supply. This could benefit root mats which help stabilize fine sediments and dissipate high flows throughout the floodplain.

In the upland vegetation type and areas proposed for treatments, there could be potential changes to primary or secondary range and surrounding areas in proximity to some key areas. Treatments could also open up transitional areas which may have remnant rangeland vegetation or seed sources (transitory range). The availability and vigor of forage in these areas could be increased by thinning.

Meadow treatments could allow for potential changes in ecological status (conditions) of meadow key areas within the Duck Lake and Robbers Creek Allotments. Long term monitoring of meadow key areas within the project areas has been ongoing. The five year resampling showed that the Barne's Flat plot was rated excellent in 2000-2015 and the Duck Lake plot was rated good from 1999-2014. The Robbers Cr. Lower Meadow plot was rated "good" in 1999, "excellent" from 2007 to 2014, and "good" in 2018. With the exception of a fluctuating trend at one plot (Robbers Creek Lower Meadow), conditions and trends at these areas are considered satisfactory.

Riparian and aspen treatments could allow for a slight increase in primary range, but most of the increase would be in secondary range or surrounding areas. Portions of these areas are sometimes used by livestock.

Since no increases in livestock permitted numbers would occur under this project, the treatments would not be expected to change utilization levels in any of the vegetation types. Impacts from treated aspen areas are anticipated to be short term in duration, since young aspen should grow above the browse level within 3-8 years.

These potential changes to forage condition and availability would likely diminish over time and be difficult to measure however and could also be influenced by other conditions such as drought. Long-term maintenance may also require follow-up treatments to ensure conifer cover does not reach pre-treatment levels in the future.

Although new areas of transitory rangeland could be created, allotments in this area have not been reliant on transitory rangeland. Most key areas are considered to be in satisfactory condition, and treatments are not likely to result in long term substantial changes to rangeland vegetation availability or condition as it relates to grazing. Allotment vegetative conditions would be expected to be maintained or improved with existing grazing management.

Fire Management Treatments

Effects of fire management would be like the treatments for health and resiliency restoration (thinning) activities, since areas of potential transitory range could be opened up. Smaller encroaching trees, brush, and forest debris could also be removed.

Fire management treatments would not be expected to change utilization levels since these areas are along the eastern boundary of the allotments which are outside of primary or secondary range and typically not grazed by livestock.

Swain Meadow Activities

The proposed thinning activities in the surrounding upland conifer forest could have a beneficial effect to general watershed conditions in previously encroached areas along the ecotone and lower meadow area. Moist or saturated soil conditions could be increased in these areas during the growing season to support higher rates of vegetative growth.

Transportation System Activities

Proposed changes in the road system are not expected to have a measurable effect on allotment conditions throughout the planning area.

Powerline Treatment Activities

The likely effects of proposed powerline treatments would be similar to effects of upland conifer forest and aspen thinning treatments, but in a smaller area within a portion of the Duck Lake Allotment.

General Allotment Operations (livestock distribution and management)

Health and Resiliency Restoration Treatments

Implementation of project activities may detrimentally affect cattle distribution. Effects include, but are not limited to, potential increases in noise and traffic which may influence the movement of cattle along trails

and roads. During treatments, cattle may seek to avoid project activities and livestock distribution could be negatively affected. Access for grazing permittees could also be impacted during the timeframe while treatments are ongoing.

Livestock access could be improved along Robbers Creek to possibly allow for cattle to trail up and down the creek area in a different manner than before treatments. Thinning activities could also improve livestock access to other areas of rangeland forage areas as a result of treatments.

Long term monitoring areas and plot markers could be present in some treatment areas within the allotments. Plots that could be in the way of thinning treatments include two plots in Robbers Creek Allotment and two plots in the Duck lake Allotment. Three plots in Swain Meadow could also be near hydrologic treatment activities and thinning along the edges.

Although the permittees ability to herd and distribute livestock throughout the allotments could be improved, livestock have been generally been dispersed and herded in a similar way each season and no major changes to existing operations is expected with forest health and resiliency treatments. While the monitoring plots could be affected, long term monitoring plots could possibly be reinstalled or relocated after the treatments are completed if markers are damaged or lost. The treatments could benefit livestock management, but access and distribution to the allotments would not be expected to greatly change in the long term.

Fire Management Activities

The effects of fire management activities to livestock operations would be like the effects of the health and resiliency restoration treatments. Under-burning as a secondary treatment in selected upland forest, aspen and meadow areas would mainly occur in the fall.

No major changes to existing allotment operations within these allotments is expected with fire management treatments.

Swain Meadow Activities

Design features of the project have been included in the proposed action which describe resting Swain Meadow from grazing after treatments. While other portions of the Robbers Creek Allotment would still be available, as well as other permitted allotments in the rotation system, resting Swain Meadow after treatments could influence future livestock herding and distribution patterns through the area depending on the duration and need.

No major changes to existing allotment operations within these allotments is expected with Swain Meadow treatments.

Transportation System Activities

The old road across Swain Meadow is not needed for current allotment operations. Neither are the other transportation system activities described in the proposed action. No major changes to existing allotment operations within the Robbers Creek Allotment is expected with the transportation system proposals.

Transmission Powerline Activities

Treatments along the powerline could improve access within the Duck Lake Allotment since the portion near Robbers Creek may be used by livestock. The powerline area is already accessible to livestock and no major changes to existing allotment operations within the allotment is expected with powerline treatment proposals.

Range improvements (in vicinity of units)

Health and Resiliency Treatments

With the exception of the Clover Valley fence (FECV1), older fences in the vicinity of proposed treatment areas are just remnants that are no longer used or maintained. The fence in the Clover Valley Allotment is used and maintained and a portion may cross through an aspen unit (319). Upland forest treatments are also be proposed in areas surrounding this fence (units 206 and 134)

The FECV1 fence is visible and could be avoided during project activities. Any new aspen fences implemented for health and resiliency treatments would be planned with livestock distribution in consideration.

Fire Management Activities

No range fences are in the vicinity of proposed burning activities. The vernal pool protection fence may be near under-burning unit 177, aspen unit 304, and thinning unit 139. This fence would need to be avoided and repaired or replaced if any parts are damaged or removed during proposed fire management activities.

Swain Meadow Activities

Design features (including a proposed drift fence) have been included in the proposed action, to assist with implementing the rest period for Swain Meadow after hydrological treatments are completed. This fence would prevent cattle from drifting down to Swain Meadow from the northern portion of the Robbers Creek Allotment.

No major changes to range improvements within the Robbers Creek Allotment are expected under the current Clover Valley Complex grazing system with proposed Swain Meadow activities.

Transportation System and Powerline Activities

No range improvements are in the vicinity of proposed road activities and no range improvements are in the vicinity of proposed powerline activities in the Duck lake Allotment. No major changes to range improvements are expected with the proposed transportation and powerline activities.

Cumulative Effects

Previous vegetation management projects have usually benefited the rangeland resources although they were mainly outside of riparian, meadow and aspen communities or were relatively small. Maintenance of past projects are reasonably foreseeable actions, along with other planning projects which may be in the vicinity of the Robbers Creek Project planning area. Return of wildfires that have occurred in portions of the Robbers Creek, Clover Valley, and Duck Lake Allotments, and fire suppression activities (controlled burning) that extended into various surrounding areas could also be foreseeable.

Alternative 2 would include these areas along with upland forest treatments near Robbers Creek corridor. When added with the past, present and reasonably foreseeable actions the cumulative effect that Alternative

2 would have on the environment is that rangeland in the project area would likely have better forage conditions.

Past treatments or more recent activities have not adversely impacted rangeland resources or resulted in major changes in grazing use. No known reasonably foreseeable actions are expected to occur in the project area that would have additional impacts to rangeland resources.

Existing permit administration and project response options including fencing would help minimize impacts of treatments in or near livestock use areas. The LRMP as amended provides standards and guidelines for grazing designed for resource conservation and sustainable use of rangelands. Grazing permit administration and monitoring would continue to occur as needed to ensure that the combined effects of proposed projects and ongoing activities, such as grazing, meet Forest objectives for desired conditions.

The cumulative effects of alternative 2 would generally be positive for rangeland vegetation, general allotment operations, and range improvements. Cumulative effects on rangelands through project activities and grazing are expected to be minimal on the allotments since management requirements and the LRMP standards and guidelines would mitigate potential effects to acceptable levels.

Alternative 2 –No Action

Direct and Indirect Effects

The no-action alternative would not result in substantial changes to rangeland vegetation, general allotment operations, or range improvements because no project activities would occur. Allotment rangeland vegetation conditions and areas available for livestock grazing would be expected to continue similar to current levels. Current authorized livestock grazing in the Robbers Creek, Clover Valley, and Duck Lake Allotments would continue under the term grazing permits, allotment management plans, and annual operating instructions. No range improvements would be affected. Ongoing allotment management is described in the affected environment section.

Cumulative Effects

Cumulative effects for the no action alternative, when added to the effects considered for cumulative effects analysis as provided in the project record, include historical and continued grazing by livestock and wildlife (deer).

The opportunity to treat and enhance selected units in the vicinity of allotment key areas would not be present with the no action alternative. Although there would be no overall direct or indirect impacts to rangeland resources, grazing would continue to contribute to future management of the area as wildlife use the forest and livestock are permitted to graze on the allotments. Future management would not include this vegetation management project which could benefit rangeland resources in the project area.

Wildlife

The following documents are hereby incorporated by reference into this assessment and are summarized throughout this section. These documents are part of the Robbers Creek Watershed Restoration Project Record and may be requested for additional information regarding terrestrial wildlife.

- Robbers Creek Watershed Restoration Biological Assessment; Terrestrial Wildlife
- Robbers Creek Watershed Restoration Biological Evaluation; Terrestrial Wildlife
- Robbers Creek Watershed Restoration Management Indicator Species Report

- Robbers Creek Watershed Restoration Migratory Bird Species Report

The proposed action is consistent with the following direction for terrestrial wildlife:

Federal

- Bald and Golden Eagle Act of 1940, as amended
- Departmental Regulation 9500-4
- Code of Federal Regulations (23, 36, 50 CFR)
- Endangered Species Act (ESA 1976)
- Forest Service Manual and Handbooks (FSM/H 1200, 1500, 1700, 2600)
- National Environmental Policy Act (NEPA 1969)
- National Forest Management Act (NFMA 1976)
- The Migratory Bird Treaty Act of 1918, as amended
- USFWS Official Species List

Forest Service direction for TES species incorporated in the BE for this project can be found in the Forest Service Manual (FSM 2670.31, FSM 2670.32). Information regarding threatened, endangered, proposed, candidate and sensitive species is also obtained through the cooperation of the USFWS and the California Department of Fish and Wildlife (CDFW).

Consultation with USFWS

A list of T&E species was provided by USFWS, “List of Threatened and Endangered species that may occur in your proposed project location, and/or may be affected by your proposed project,” issued December 14, 2020, accessed via USFWS web page (<https://ecos.fws.gov/ipac/>), (Sacramento Office – Consultation Code: 08ESMF00-2020-SLI-0735, Event Code: 08ESMF00-2020-E-02320).

Forest Management Direction

- Lassen National Forest Land and Resource Management Plan (LNF LRMP, USDA 1992)
- Regional Forester (Region 5) policy and management direction
- Regional Forester (Region 5) Sensitive Plant and Animal Species List (June 10, 1998), as amended July 3, 2013
- Sierra Nevada Forest Plan Amendment (SNFPA) and its implementing Final Environmental Impact Statement (FEIS), Record of Decision (ROD), January 2001
- Sierra Nevada Forest Plan Amendment (SNFPA) and its implementing Final Supplemental Environmental Impact Statement (FSEIS), Record of Decision (ROD), January 2004
- Record of Decision, Sierra Nevada Forests Management Indicator Species Amendment. U.S. Forest Service, Pacific Southwest Region. December 2007

Environmental Consequences

Table 18 provides a summary of the Threatened Endangered and Forest Service Sensitive species and the effects to each species and or its habitat. Additional information on these species and why they are or are not analyzed further are to be found in the 2020 Robbers Creek Watershed Restoration Project Biological Evaluation and Biological Assessment, located in the project record at the Almanor Ranger District. The following section summarizes direct, indirect and cumulative effects to species identified as May Effect or Category 3 species as identified in Table 18.

Table 18:Threatened, Endangered, Proposed, Candidate and Sensitive animal species or their habitat that occur in the project and the determination of effects from the Robbers Creek Project.

| Threatened, Endangered and Sensitive Species (Scientific Name) | Species Status* | Habitat or Ecosystem Component | Category for Project Analysis** | Determinations*** |
|--|-----------------------------|--|---------------------------------|-------------------|
| | | | | Proposed Action |
| Invertebrates | | | | |
| Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>) | USFWS : FT | Elderberry in the Central Valley of CA | 1 | WNA |
| Shasta hesperian snail (<i>Vespericola shasta</i>) | USFS : S | Moist bottom lands | 1 | WNA |
| Western Bumblebee (<i>Bombus occidentalis</i>) | USFS : S | Access to flowering plants and abandoned rodent burrows | 2 | WNA |
| Reptiles | | | | |
| Western pond turtle (<i>Emys marmorata</i>) | USFS : S | Riverine and Lacustrine | 1 | WNA |
| Birds | | | | |
| Bald eagle (<i>Haliaeetus leucocephalus</i>) | USFS : S USFWS : BCC | Large trees adjacent to riverine and lacustrine | 1 | WNA |
| California spotted owl (<i>Strix occidentalis occidentalis</i>) | USFS : S, MISUSFWS : BCC | Late seral closed canopy coniferous forest | 3 | MAI |
| Greater sandhill crane (<i>Grus canadensis tabida</i>) | USFS : S | Prefers open habitats (grasslands and croplands) with shallow lakes and fresh emergent wetlands | 3 | MAI |
| Great gray owl (<i>Strix nebulosa</i>) | USFS : S | Late seral closed canopy coniferous forest adjacent to wet meadows | 2 | WNA |
| Northern goshawk (<i>Accipiter gentilis</i>) | USFS : S | Late seral closed canopy coniferous forest | 3 | MAI |
| Willow flycatcher (<i>Empidonax trailii brewsteri</i>) | USFS : S USFWS : BCC | Riparian with dense willows, upland thickets, and bushes | 3 | MAI |
| Yellow rail (<i>Coturnicops noveboracensis</i>) | USFS : S | Marshy habitat | 2 | WNA |
| Mammals | | | | |
| Gray wolf (<i>Canus Lupus</i>)**** | USFWS : FE | Habitat generalist | 3 | MAINLA (see BA) |
| Pacific marten (<i>Martes caurina</i>) | USFS : S | High elevation late seral closed canopy coniferous forest | 3 | MAI |
| Sierra Nevada red fox (<i>Vulpes vulpes necator</i>) | USFS : S | Mainly mountain meadows and woodlands near treeline. Some winter use of high elevation coniferous forest | 3 | MAI |
| California wolverine (<i>Gulo gulo luteus</i>) | USFWS : FP USFS : S | Remote, high elevation, tree-line habitat and areas of deep snowpack | 2 | WNA |
| Pacific fisher (<i>Pekania pennanti</i>) | USFS : S | Late seral closed canopy coniferous forest | 2 | WNA |

| Threatened, Endangered and Sensitive Species (Scientific Name) | Species Status* | Habitat or Ecosystem Component | Category for Project Analysis** | Determinations*** |
|--|-----------------|--|---------------------------------|-------------------|
| | | | | Proposed Action |
| Pallid bat (<i>Antrozous pallidus</i>) | USFS : S | Most common in open, dry habitats with rocky areas (rocky outcrops, cliffs and crevices) | 3 | MAI |
| Townsend's big-eared bat (<i>Corynorhinus townsendii</i>) | USFS : S | Mesic habitats | 3 | MAI |
| Fringe-tailed myotis (<i>Myotis thysanodes</i>) | USFS : S | Hardwood-conifer open canopy forests | 3 | MAI |

*Species Status: USFWS: FE = Federal Endangered, FT = Federal Threatened, FP = Federal Proposed, FC = Federal Candidate, BCC = U. S. Fish and Wildlife Service Birds of Conservation Concern, SOI = Species of Interest. USFS : S = U.S. Forest Service - Sensitive, USFS : MIS = U.S. Forest Service – Management Indicator Species CDFW: SE = State Endangered, ST = State Threatened, FP = State Fully Protected, SSC = State Species of Special Concern,

**Category 1: Species whose habitat is not in or adjacent to the Project Area and would not be affected by the project. Category 2: Species whose habitat is in or adjacent to the Project Area, but would not be either directly or indirectly affected by the project. Category 3: Species whose habitat would be either directly or indirectly affected by the project.

***Determinations: USFWS T & E Species: WNA = Will Not Affect, MAINLA = May Affect but Is Not Likely to Adversely Affect Individuals or their designated critical habitat, MAILAA = May Affect and Is Likely to Adversely Affect Individuals or their designated critical habitat. Proposed (P) Species: WNA = Will Not Affect, MAINLJCE = May Affect but is Not Likely to Jeopardize the Continued Existence of Individuals, MAILJCE = May Affect but is Likely to Jeopardize the Continued Existence of Individuals Proposed Critical Habitat: WNA = Will Not Affect, NLRDAM = Not Likely to Result in the Destruction or Adverse Modification of their Proposed Critical Habitat, LRDAM = Likely to Result in the Destruction or Adverse Modification of their Proposed Critical Habitat

FS Sensitive Species: WNA = Will Not Affect, MAI = May Affect Individuals, but is not likely to result in a trend toward Federal listing or loss of viability, MAILRTFL = May Affect Individuals, and is Likely to Result in a Trend toward Federal Listing or loss of viability.

**** Gray Wolf is included in a separate Biological Assessment document.

Federally Threatened or Endangered Species

Based on the analysis conducted in Robbers Creek Project BA, it was determined that implementation of the Robbers Creek project May Affect but Is Not Likely to Adversely Affect individuals of the Federally Endangered Gray Wolf. In addition to gray wolf, other terrestrial federally listed or proposed species typically addressed on the Lassen National Forest are North American wolverine (*Gulo gulo luscus*), northern spotted owl (*Strix occidentalis caurina*) and the valley elderberry longhorn beetle (*Desmoceris californicus dimorphus*). The project area is outside the range of or lacks suitable habitat for these species, so they will not be further addressed in this document. On May 15, 2020, the Southern Sierra Nevada Distinct Population Segment (DPS) of Pacific fisher (*Pekania pennanti*) was listed as endangered under a new rule from the U.S. Fish and Wildlife Service, but the Northern California-Southern Oregon DPS, the population of fisher that includes those found in the West Shore Project area, was not listed under the Endangered Species Act due to a stable population and access to a large range of suitable habitat (USDI 2020). The Pacific fisher is addressed as a sensitive species in the project's Biological Evaluation as a Forest Service Sensitive Species.

Gray Wolf (*Canis lupus*)

Alternative 1 – Proposed Action

Direct and Indirect Effects

Because the activity area falls within the known territory of the Lassen wolf pack, there is the potential for future denning or rendezvous sites to become established in the action area during implementation. Regardless of the whereabouts of the Lassen Pack, it is not expected that the wolves foraging or traveling through would be directly impacted by the proposed actions or the noise or smoke resulting from those actions. Typically, wolves react to human disturbance through avoidance (Kovacs et al. 2016), and wolves have been documented to relocate pups out of areas of heavy equipment disturbance (Thiel et al. 1998). While reproductive success may not be influenced by the amount or types of human activities, wolf pups may be vulnerable to disturbance when younger (Frame et al. 2007). To mitigate effects, integrated design

features (IDFs) are put in place for wolves (see Appendix B IDFs). These IDFs will ensure that the presence or absence of wolves within or adjacent to the project area is known prior to implementation and additional protection measures may be established if necessary.

Since wolves are habitat generalists, the project would not make any habitat unsuitable to wolves, other than disturbance-caused by short-term avoidance of otherwise suitable habitat. Benefits to wolves as a result of this project may include the decommissioning of roads and unauthorized trails proposed for the Robbers Creek project and habitat improvement for prey species. Meadow, aspen and upland forest restoration actions would improve habitat conditions for prey species wolves rely on. Long term habitat improvements may provide better foraging opportunities for wolves in the future.

Conversations with the California Department of Fish and Wildlife (CDFW) revealed that they will notify forest service biologists if wolf locations shift and there is concern about a project taking place that would affect wolves. Coordination with CDFW and US Fish and Wildlife Service may result in modified distances or more flexible dates for this specific conservation measures. For example, if the den or rendezvous sites are clearly separated from project-generated disturbances by topographic features or terrain, seasonal restrictions may be adjusted or eliminated, as approved by the Service. Historical dens may require a LOP if CDFW or the Service determines it is necessary.

Because disturbance-caused effects to den and rendezvous sites would be mitigated (see Appendix B IDFs) and CDFW is intensively tracking the pack using cameras and GPS collars to allow for a pause in project activity and/or the creation of buffer zones once a den or rendezvous site is discovered, the project effects are largely discountable and insignificant.

Cumulative Effects

In order to understand the contribution of past actions to the cumulative effects of the alternatives, this analysis assumes that current environmental conditions are a result of effects from past actions. This is because existing conditions reflect the aggregate effect of all previous human actions and natural events that have affected the environment and might contribute to cumulative effects. Cumulative effects discussions contained in this report do not try to quantify the effects of past actions by adding up all previous actions on an action-by-action basis.

The Robbers Creek project area experiences moderate human use. In the winter and spring snowmobile users and cross-country skiers utilized the groom trails and roads. During the summer and fall the area sees a fair amount of camping and recreating with fall use being primarily wood cutting and forest management activities. An increase in human activity would be expected during project implementation. In addition, private land activities would contribute to increases in noise disturbance and human activity as well. Plans are currently in place to treat approximately 3,800 acres of private timber land adjacent to the project area. The Robbers project in combination with private land actions and existing human use would likely result in wolves avoiding the area during implementation. Implementation would occur over many years and phases and would not occur over the entire area all at once.

Alternative 2 – No Action Alternative

Direct, Indirect Effects and Cumulative Effects

Under the No Action Alternative, activities proposed to restore ecological health to the Robber's Creek project area would not occur and habitat improvements for wolf prey species would not be realized. Current trends resulting in degraded aspen, meadow and riparian habitats would continue and further losses of these habitats are expected under this alternative. However, for a habitat generalist capable of traversing great distances the no action alternative would have no direct, indirect or cumulative effects to wolf.

Forest Service Sensitive Species

California Spotted Owl (Strix occidentalis occidentalis)

Alternative 1, Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

There would be no effects from treatment activities to the most sensitive portions of California spotted owl habitat, the protected activity center (PAC) and home range core area (HRCA), and only a minor portion (10%) of a home range is proposed for treatment (see Table 19 and Figure 2 map). Direct effects are minor due to the distance from the nest core and the implementation of limited operating periods. Proposed treatments in suitable habitat would increase forest heterogeneity and resiliency at the stand scale and would not cause a reduction in habitat quality or quantity. Given the minor direct and indirect effects to CSO and their habitat the action alternative is not expected to have a measurable cumulative effect. The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual California spotted owls (MAI)** but are not likely to result in a trend towards federal listing or loss of species viability.

Table 19: Suitable habitat proposed for treatment in the action alternative would maintain suitability post treatment.

| Treatment Type | | Treatment Acres in Home Range | Acres of Suitable Habitat Pre-treatment | Acres of Suitable Habitat Post treatment |
|-----------------|----------------|-------------------------------|---|--|
| Mechanical Thin | Upland Forest | 261 | 188 | 188 |
| | Aspen | 12 | 0 | 0 |
| | Meadow | 110 | 0 | 0 |
| | Meadow Ecotone | 43 | 0 | 0 |
| Hand Thin | Meadow | 8 | 0 | 0 |

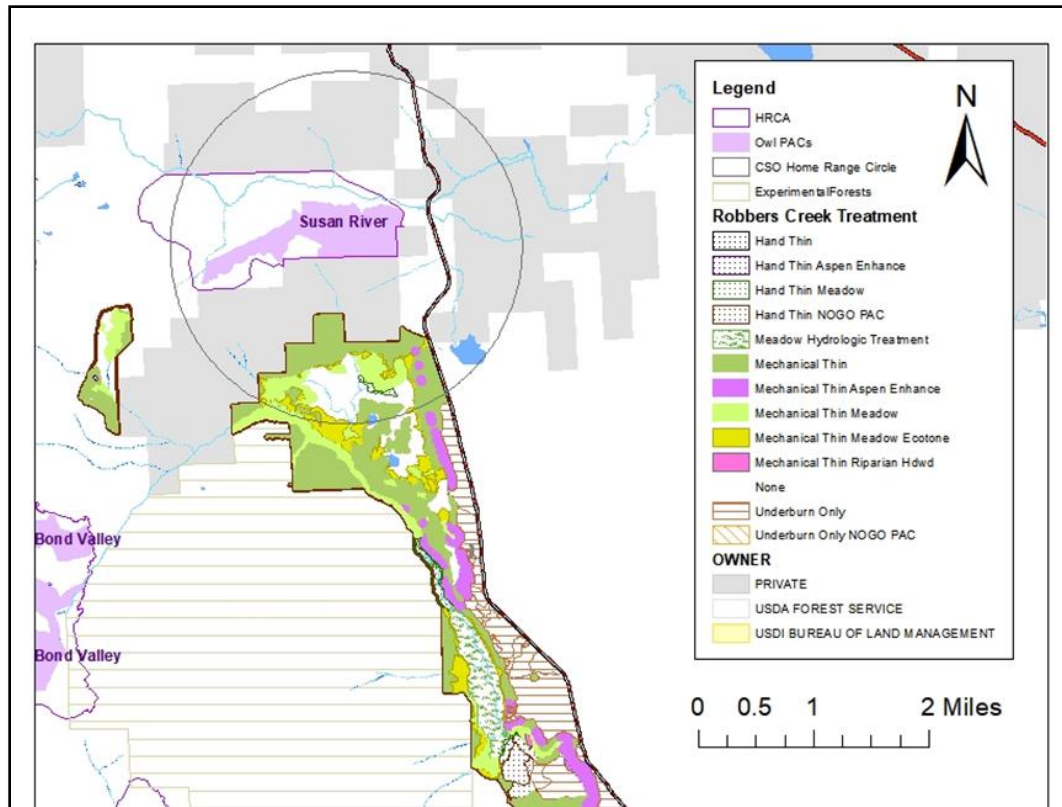


Figure 2. California Spotted Owl analysis area within and adjacent to the Project Area.

Alternative 2, No Action

Summary of direct, indirect and cumulative effects, and viability determination

Based on the analysis presented in the Robber Creek Biological Evaluation the no action alternative (alternative 2) **will not affect California spotted owl** populations or the species (WNA) because: while the overall health of forested stands will continue to decline, no habitat improvements will be realized in the planning area and habitat would remain vulnerable to high severity wildfire there is very little immediate impact to the species.

Northern goshawk (*Accipiter gentilis*)

Alternative 1 Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

While disturbance to goshawks may occur during proposed project activities, the Robbers Creek project would work to align northern goshawk habitat with historical forest conditions for which the species select. Limited Operating Periods would prohibit treatments from occurring in the breeding season (see Appendix B IDF's), reducing disturbance to nesting goshawks. Treatments within PACs would not reduce canopy cover and are designed to promote habitat features, resulting in only minor shifts in habitat (Table 22). Table 22 summarizes the proportion of nesting and foraging habitat before and after proposed treatments within the protected activity center.

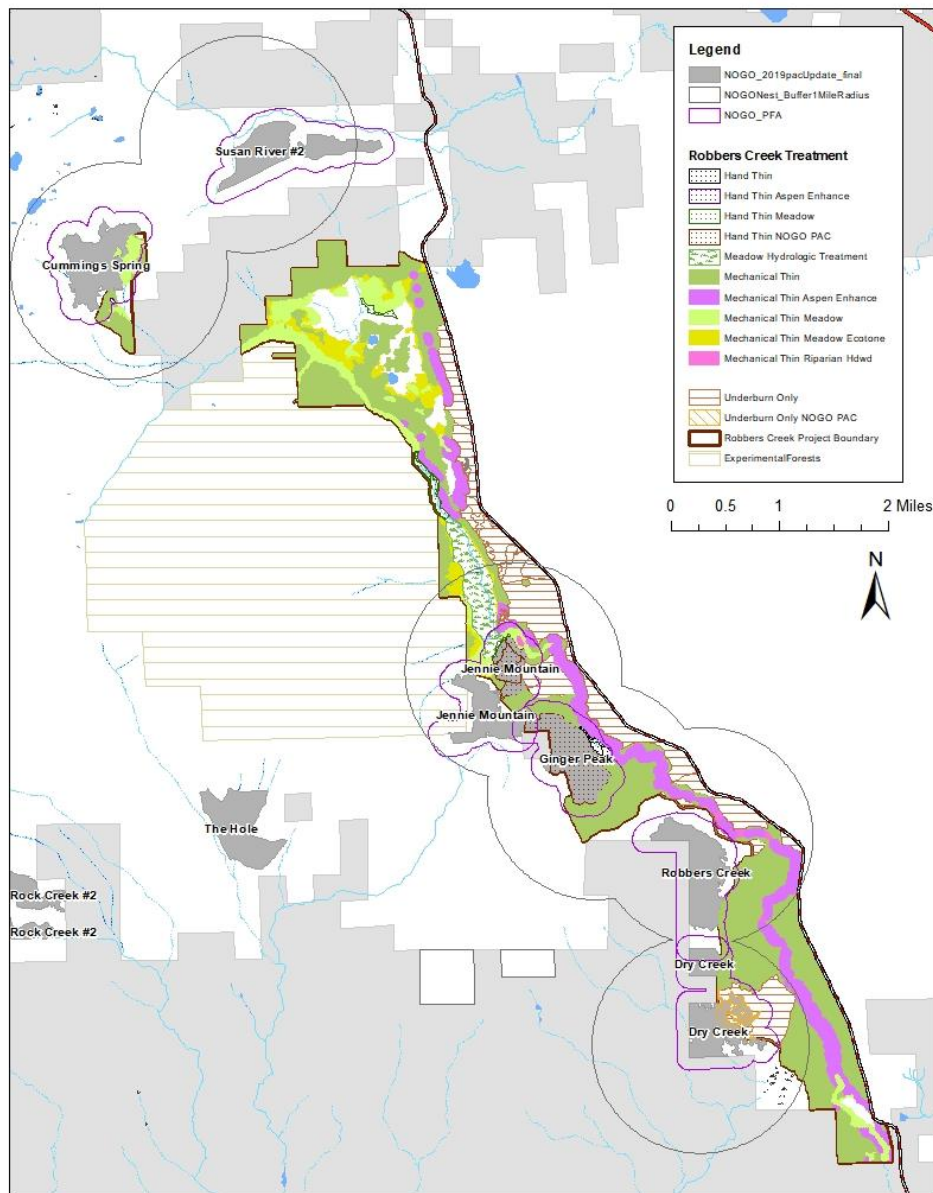


Figure 3 Northern Goshawk Analysis Area within & Adjacent to the Project Area

and post fledgling area (PFA). Nesting habitat would not be reduced within the PACs receiving treatment however, nesting habitat would be reduced by 4% or less in each of the three most affected PFAs (Ginger Peak, Dry Creek and Jennie Mountain) (Table 20). All changes in CWHR

nesting habitat are a result of treatments within aspen, meadows or east side pine treatments where reductions in canopy cover meet restoration objectives.

At the project area scale, suitable nesting habitat is reduced by 46%, within the existing home-ranges reduction in nesting habitat is much more modest, at 8% (Table 21 and Figure 3). This reduction in nesting habitat at the project area scale is balanced by benefits at the larger landscape-scale, including an increase in suitable foraging habitat, reduced stand-replacing wildfire risk, as well as an increase in prey availability and forest structural diversity. Remaining trees in nesting habitat would have an increased chance of reaching large size in a shorter timeframe than would be expected without treatment; thus, nesting habitat would improve over the long-term. Foraging and some nesting habitat would be thinned during treatment activities, and high severity wildfire risk would decrease in all treated areas of the goshawk analysis area. The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual northern goshawks (MAI)**, but they are not likely to result in a trend towards federal listing or loss of species viability.

Table 20: Change in proportion of goshawk territories before and after treatment. Note: *asterisk indicates territories with treatments inside PAC boundaries.

| PAC + PFA name (#) | % Percentage of territory | | | | | | | | |
|------------------------------|---------------------------|------|--------|------------------|------|--------|-------------|------|--------|
| | Nesting Habitat | | | Foraging Habitat | | | Non-habitat | | |
| | Pre | Post | Change | Pre | Post | Change | Pre | Post | Change |
| Susan River (22-4) | 82% | n/a | none | 9% | n/a | none | 5% | n/a | none |
| Robber's Creek (22-5) | 78% | 75% | -3% | 10% | 13% | +3% | 11% | 12% | +1% |
| Cummings Spring (22-6) | 67% | 66% | -1% | 17% | 20% | +3% | 8% | 15% | +7% |
| Ginger Peak (22-7) * | 92% | 88% | -4% | 3% | 3% | none | 5% | 9% | +4% |
| Dry Creek (22-8) * | 51% | 47% | -4% | 37% | 40% | +3% | 9% | 9% | none |
| Jennie Mountain (22-9) * | 51% | 48% | -3% | 21% | 17% | -4% | 22% | 29% | +7% |

Table 21: Acres of Suitable Northern Goshawk Habitat before and post treatment acres. Project Area (5,080 acres) and Analysis Area (6 home ranges, note 5 home ranges include treatments)

| CWHR Type* | Habitat Type | Project Area | | | Home Range | | |
|-----------------------|--------------|---------------|----------------|-------------|---------------|----------------|------------|
| | | pre-treatment | post-treatment | % Change | pre-treatment | post-treatment | % Change |
| 3M | Foraging | 221 | 0 | -100% | 75 | 29 | -61% |
| 3D | Foraging | 13 | 0 | -100% | 168 | 168 | 0 |
| 4P | Foraging | 1150 | 1645 | +74% | 2236 | 2411 | +8% |
| 5P | Foraging | 13 | 18 | +34% | 337 | 337 | 0% |
| Total** | | 1397 | 1961 | +44% | 2816 | 2945 | +5% |
| 4M | Nesting | 1522 | 833 | -46% | 1921 | 1714 | -11% |
| 4D | Nesting | 669 | 262 | -61% | 2180 | 1884 | -14% |
| 5M | Nesting | 68 | 134 | +95% | 1042 | 1079 | +4% |
| 5D | Nesting | 0 | 0 | 0 | 445 | 445 | 0% |
| 6 | Nesting | 0 | 0 | 0 | 0 | 0 | 0% |
| Total** | | 2259 | 1221 | -46% | 5587 | 5122 | -8% |
| Grand Total ** | | 3656 | 3182 | -13% | 8404 | 8066 | -4% |

*3 = Pole Tree 6 - 11" DBH, 4 = Small Tree 11 - 24" DBH, 5 = Medium/Large Tree >24" DBH, 6 = Multi-layered Tree. D = Dense Canopy Cover (> 60%), M = Moderate Canopy Cover (40 - 59%), P = Open Canopy Cover (25 - 39%). **Due to rounding, values presented may not add up precisely to the totals indicated

Cumulative Effects

The cumulative effects analysis area consists of the six home range circles described above, delineated to extend out from the active (or most recently active) nests in a circle with a 2-mile diameter, equaling 2,011 acres each (see Figure 3). This bounding was selected for the cumulative effects analysis because it is a large enough area to encompass any additional goshawk territories that may potentially occur outside the treatment unit boundaries that could be affected by either the proposed actions or by concurrent actions on federal lands.

In the consideration of proposed federal projects, the goal of a cumulative effects analysis is to provide decision makers and the public with comprehensive information about “the impact of the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions” (40 CFR 1508.7). In order to understand the cumulative effects of the proposed action this analysis relies on current environmental conditions as a proxy for the impacts of past actions. The existing condition reflects the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Ongoing actions incur little change or effects to goshawks in the project area, therefore the cumulative impacts as a result of the action alternative are expected to be inconsequential to goshawk.

As of the writing of this analysis, no future treatments on federal lands, outside regular maintenance activities, are planned for the cumulative effects’ analysis area. However, a query of Cal Fire Timber Harvest Plans and Nonindustrial Timber Management Plans showed several future treatments. Table 22 displays the amount of private land treatments planned within each goshawk territory. There are three territories affected by cumulative future effects to habitat; Robbers Creek, Dry Creek and Ginger Peak. Private land accounts for 22%, 30% and 7% of each territory. These treatments would reduce the existing habitat. The proposed action treatments in these territories do not reduce habitat below suitability and therefore would not act cumulatively with these habitat reducing treatments. If these treatments were to

take place simultaneously with the proposed treatments or occur during the breeding season additional risks to individual birds or nesting birds may be incurred.

Table 22: Proportions of goshawk habitat within each goshawk territory including the percentage of each territory proposed for treatment in the action alternative and private land. Note: goshawk territories equal the PAC plus the Post fledgling area.

| PAC + PFA name (#) | % Percentage of territory | | | | |
|-------------------------|---------------------------|------------------|--------------------------|--------------|--|
| | Nesting Habitat | Foraging Habitat | Robbers Creek Treatments | Private land | Acres of Future treatment private land |
| Susan River (22-4) | 82% | 9% | 0% | 0% | 0 |
| Robber's Creek (22-5) | 78% | 10% | 5% | 22% | 22 acres** |
| Cummings Spring (22-6) | 67% | 17% | 14% | 12% | 0 |
| Ginger Peak* (22-7) | 92% | 3% | 79% | 7% | 6 acres |
| Dry Creek* (22-8) | 51% | 37% | 30% | 30% | 22 acres** |
| Jennie Mountain* (22-9) | 51% | 21% | 42% | 2% | 0 |

*Territories that include treatments within the PAC area; Ginger Peak and Jennie Mountain include hand thinning in the PAC and Dry Creek includes underburning in the PAC, all other territories do not include treatments within the PAC.

** These acres represent the same area where the Robbers Creek and the Dry Creek territories overlap.

Alternative 2 – No Action Alternative

Summary of direct, indirect and cumulative effects, and viability determination

The Robbers Creek Biological Evaluation determined that the Alternative 2 **will not affect Northern goshawk** populations or the species (WNA) because: while the overall health of forested stands will continue to decline, no habitat improvements will be realized in the planning area and habitat would remain vulnerable to high severity wildfire there is very little immediate impact to the species.

Willow flycatcher (*Empidonax trailii*)

Alternative 1 – Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual willow flycatcher (MAI)** but is not likely to result in a trend towards federal listing or loss of species viability. This determination is based on population and habitat assessments of the region (Green et al. 2003, Loffland et al. 2014), local knowledge of the willow flycatcher, and professional judgement. Avoidance of the breeding territories minimize direct effects to willow flycatchers during the breeding season. In the long term, actions in Alternative 1 would return hydrologic function to Swain Meadow, with improved growing conditions for riparian hardwoods. Streamside zones would support dense patches of

willow, alder, and other meadow hardwoods, providing bank stability, shade to the stream, and high quality WIFL habitat. Restoration objectives have been developed in large part to improve habitat conditions for this species. Namely, the increase in meadow wetness, willow cover, and herbaceous vegetation height would all benefit willow flycatcher.

Cumulative Effects.

The effects of intensive past grazing activities have resulted in the current degraded state and loss of willow flycatcher habitat in the project area. In addition, fire suppression in the last 100 years may have contributed to additional drying and shading of the meadow where encroaching conifers now compete for water resources and sunlight. The action alternative, in addition to ongoing and future activities as, described in the Robbers Creek Biological Evaluation, would not have a cumulative negative impact on WIFL or their habitat. Rather this alternative would establish an upward trend in developing suitable habitat overtime, thus resulting in a positive cumulative effect.

Alternative 2 – No Action Alternative

Summary of direct, indirect and cumulative effects, and viability determination

The Robbers Creek Biological Evaluation determined that Alternative 2 **will not affect willow flycatcher** populations or the species (WNA) because: while it forges the opportunity to recover suitable breeding habitat the No Action Alternative would avoid direct and indirect effects to willow flycatcher and their habitat.

Greater Sandhill Crane (Grus canadensis tabida)

Alternative 1 – Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual sandhill crane** but is not likely to result in a trend toward Federal listing or loss of viability (MAI) for the species in the Project area. There would be little negative direct, indirect or cumulative effects to sandhill cranes as a result of Alternative 1 because 1) The meadow and ecotone thinning may indirectly benefit nesting cranes by improving habitat suitability 2) direct and indirect negative effects would be limited to disturbance, the potential of which would be reduced by the application of LOPs, as per project design and, 3) there would be no negative effects other than some potential for increased disturbance to foraging individuals. Restoration objectives have been developed in large part to improve habitat conditions for the crane and other focal meadow-dependent species. The increase in meadow wetness, areas of ponded water, and herbaceous vegetation height would benefit this species, reducing predation rates due to dry conditions and lack of cover, increasing foraging habitat, and reducing disturbance from unauthorized vehicles.

Cumulative Effects

The cumulative effects analysis area for the sandhill crane in the Project is the same as the analysis area for direct and indirect effects: Swain Meadow. Swain meadow has experienced over a century of grazing pressure from livestock. The effects of intensive past grazing activities have resulted in the current degraded state and loss of high-quality sandhill crane habitat. In addition, fire suppression in the last 100 years may have contributed to additional drying of the meadow where encroaching conifers now compete for water resources.

Ongoing actions within Swain Meadow include cattle grazing, general recreation, and fuelwood cutting. Incidental effects to Swain meadow and associated crane habitat may occur if unauthorized motor vehicles drive into the meadow. Authorized fuel woodcutting and recreation are not expected to impact crane habitat when these activities are conducted in accordance with regulations. Spring and summer livestock grazing can cause a loss of nests and young due to nest desertion and trampling of young. Since grazing in Swain Meadow is limited to after August 15 to meet Willow Flycatcher guidelines, the current intensity of grazing is very low, and cranes regularly occupy grazed meadows, grazing is unlikely to negatively impact cranes in Swain meadow. There are no future projects planned for Swain Meadow or within crane post-breeding habitat. The Action Alternative, in addition to the above-mentioned cumulative impacts, would not have a cumulative negative impact on crane or their habitat. Rather this alternative would establish an upward trend in developing suitable habitat overtime, thus resulting in a positive cumulative effect.

Alternative 2 – No Action Alternative

Direct and Indirect Effects

Summary of direct, indirect and cumulative effects, and viability determination

The Robbers Creek Biological Evaluation determined that Alternative 2 **will not affect sandhill crane (WNA)** populations or the species as no actions will occur. While the No Action Alternative would avoid direct and indirect effects to sandhill crane and their habitat it would also forgo the opportunity to recover suitable breeding habitat.

Cumulative Effects

There would be no cumulative effects (40 CFR 1508.7) as a result of the no action alternative, since there are no direct or indirect effects. However, current trends in meadow hydrology and degradation would continue into the reasonably foreseeable future, compounding past and present actions.

Pallid Bat (*Antrozous pallidus*), Townsend's Big-eared Bat (*Corynorhinus townsendii*), and Fringed Myotis (*Myotis thysanodes*)

Alternative 1 – Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual bats** but is not likely to result in a trend toward Federal listing or loss of viability (MAI), especially when considering the retention of all snags and of trees 30 inches DBH and larger within the limits of safety and operability; as well as the use of prescribed fire to promote snag development. Alternative 1 would also improve meadow hydrologic function and increase health of aspen, riparian, and meadow communities which would improve foraging habitat for these open habitat species. These mitigating factors would reduce the risk of loss of a roost or maternity colony during thinning operations. Long-term benefits would emerge as Alternative 1 would bring dense forested stands to a stocking level and species mix closer to historic conditions, allowing for the maximum growth and vigor of trees, understory vegetation and meadow communities, leading to the development of suitable roost structures and hibernacula in the form of late seral trees and snags as well as increase foraging value.

Alternative 1 – Cumulative Effects

The Robbers Creek Biological Evaluation considered past, present, and reasonably foreseeable future actions for their cumulative effects on pallid bat, Townsend's big-eared bat, and fringed myotis or their

habitat. Minor cumulative effects on bats could occur with the incremental loss of the quantity and/or quality of roosting habitat in the form of snags. Alternative 1 mitigates snag loss, reducing the cumulative impact incurred from snag loss as a result of future private land management actions in the surrounding areas and from ongoing woodcutting. The cumulative loss of these habitat components may be offset by annual snag recruitment from live trees through natural processes at a rate that may sustain this loss within the project area.

Alternative 2 – No Action Alternative

Direct and Indirect and Cumulative Effects

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 2 **will not affect on the three bat species** populations or individuals (**WNA**). Alternative 2 presents no risks to possible roost structures or hibernacula. Foraging habitat would continue to decrease in the project area as already overstocked forest stands would continue to become denser and meadow degradation would continue to worsen; this would not be optimal for bats that prefer a more open structure for foraging. Vegetation growth that would continue current trajectories would not encourage the growth of trees to large size due to constrained resources in overstocked forests, leading to less habitat available for roosting and hibernacula.

Cumulative Effects

By definition, there would be no cumulative effects (40 CFR 1508.7) as a result of the No Action Alternative, since there are no direct or indirect effects. However, current management practices would continue into the reasonably foreseeable future, compounding past and present actions.

Sierra Nevada Red Fox (*Vulpes vulpes necator*, SNRF)

Alternative 1 – Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 **may affect individual Sierra Nevada red fox** but is not likely to result in a trend toward Federal listing or loss of viability (MAI). This determination is based on the few detections in the Project area, timing of when they use habitat in the Project area, the lack of close association with any particular habitat element in forested habitat, and plans to implement LOP's to protect any den sites it is a small chance an individual animal could be disturbed by project activities but highly unlikely to affect denning animals. Overall, efforts to restore important wildlife habitat in aspen and meadows and confer resiliency to forested stands from stand replacing fire outweigh any impacts to individual animals from Project activities.

Cumulative Effects

Much of the suitable habitat on the LNF is outside the project area and within wilderness or roadless areas of LVNP and Caribou wilderness, thus cumulative effects to SNRF from activities such as vegetation and fuels management, livestock grazing, developed recreation sites may be less consequential. Of more concern to the species may be climate change effects to high elevation forests and sub alpine zones. As the habitat associations with forested environments below the sub-alpine zone for this species are not well understood, evaluation of changes in forest size classes and canopy closure are likely not informative to determining impacts to this species habitat. As the Project area appears to be winter, dispersal habitat for this species, increasing ecosystem productivity and health should in general promote increases in prey abundance for this species.

Alternative 2 -No Action Alternative

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 2, **will not affect Sierra Nevada red fox** populations or the species (WNA). Alternative 2 presents no risks to possible den sites. Foraging habitat would continue to decrease in the project area as already overstocked forest stands would continue to become denser and meadow degradation would continue to worsen; this would not be conducive to supporting healthy small mammal populations on which the SNRF preys thus decreasing foraging values of the project area. The risk of high severity wildfire occurring in and adjacent to suitable SNRF habitat would continue to increase, which could cause the reduction or elimination of SNRF habitat in the project area.

Cumulative Effects

By definition, there would be no cumulative effects (40 CFR 1508.7) as a result of the No Action Alternative, since there are no direct or indirect effects. However, current habitat trends would continue into the reasonably foreseeable future, compounding past and present actions.

Pacific Marten (*Martes caurina*)

Alternative 1 – Proposed Action

Summary of direct, indirect and cumulative effects, and viability determination

The analysis presented in the Robber's Creek Biological Evaluation concludes that Alternative 1 of the Robbers Creek Project **may affect individual marten (MAI)**, but they are not likely to result in a trend towards federal listing or loss of species viability. Changes to foraging habitat as a result of the proposed actions would result in the greatest affect to marten. However, when the extent of these changes is considered at a scale meaningful to marten breeding and dispersal areas the impacts are small. The action alternative would reduce foraging habitat by approximately 6% across the watershed and have not affect to breeding habitat (Figure 4 and Table 23). In addition, the project area does not serve as either a core breeding area or a dispersal corridor for marten, thus affects to breeding and dispersing marten are unlikely. No high-quality reproductive habitat will be affected in the HMA. Overall, the changes to habitat in the HMA as a result of the proposed actions are minor and inconsequential for marten habitat and connectivity requirements. The existing habitat quality within treatment areas is largely moderate foraging habitat and most actions would not reduce habitat below foraging quality. Actions that eliminate currently suitable habitat are designed to recover habitats that increase landscape diversity such as aspen, meadow and riparian areas. Treatment actions that modify foraging habitat in upland forests include mitigation measures designed to maintain habitat value and retain key features such as snags, down logs and large trees.

Cumulative Effects

The current condition of marten habitat at the watershed scale has been impacted by innumerable actions over the last century (and beyond) and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Therefore, the current condition serves to provide a snapshot of how past actions have shaped the landscape. The Robbers Creek project would not result in a cumulative reduction or modification of suitable habitat utilized for martin breeding or disersing when combined with any known ongoing or future actions. Cumulative effects to foraging habitat may be incurred as a result of the action alternative, however ongoing actions are minor in their effects to habitat i.e. wood cutting, Christmas tree harvest thus this effect would likely be inconsequential to marten foraging. The Robbers Creek PORFA identified 3,818 acres of future treatments on private land. However, these treatments are predominantly in the Upper Dry Creek watershed outside of the areas know to be utilized by marten. As a result of the placement of these treatments the Robbers proposed actions are not expected to have an

additive effect on marten foraging habitat when combined with these private land treatments. At this time there are no known projects on federal lands that would occur concurrently with the Robbers project or within the next ten years. The Robbers Creek project has IDFs in place to safeguard habitat elements thus reducing the risk to marten passing through the project area. Considering these measures, the Action Alternative would not likely result in a negative cumulative effect to habitat connectivity or foraging habitat for marten.

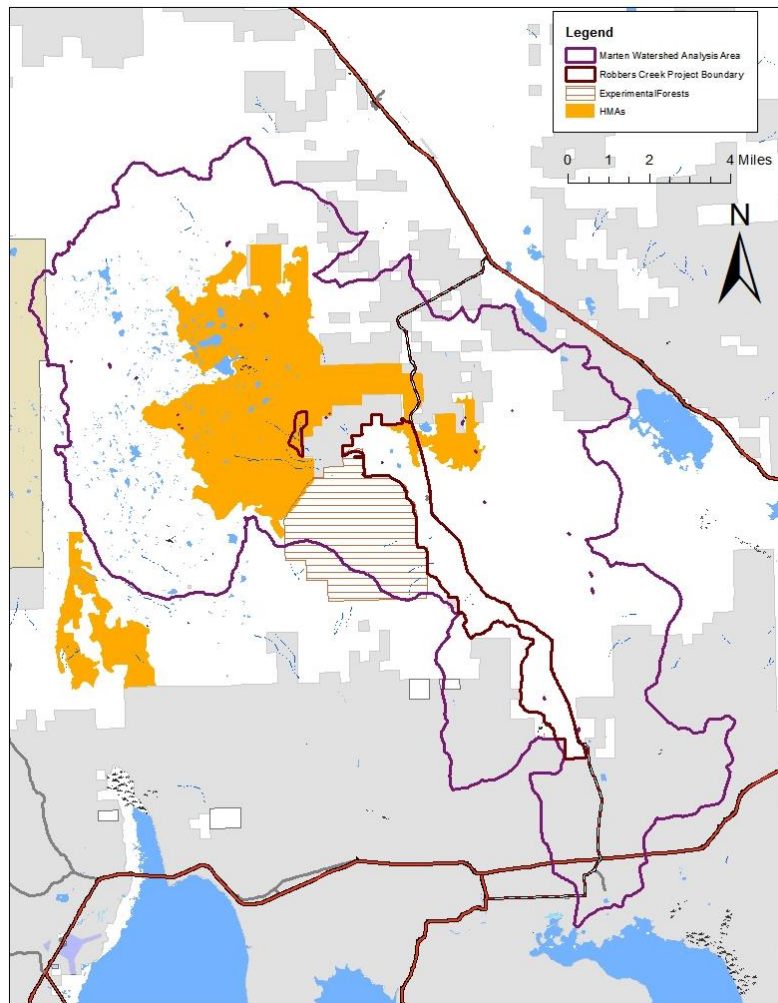


Figure 4 Map showing the two analysis areas used to determine effects to marten for the Project. The watershed analysis area (includes a selection of fourteenth field sub-watersheds). The watershed analysis area = 89,889 acres. The project area = 5,080 acres.

Table 23: Watershed analysis area change in CWHR habitat values pre- and post-implementation in the Action Alternative

| CWHR | Moderate Suitability Foraging Habitat | | High Suitability Reproductive Habitat | | |
|--|--|-----------------|--|---------------|----|
| | 4M | 4D | 5M | 5D | 6 |
| Pre-treatment habitat within watershed analysis area (acres) | 20,074 (58%) | 11,076 (32%) | 2,170 (6%) | 1,345 (4%) | 0 |
| Post-Treatment | 19,568 (55%) | 10,664 (28%) | 2,236 (8%) | 1,345 (4%) | 0 |
| Difference acres | -506 | -412 | +65 | 0 | 0 |
| % change in habitat in analysis area post- treatment | -2% | -4% | +2% | 0% | 0% |

Alternative 2 – No Action Alternative

Summary of direct, indirect, and cumulative effects, and viability determination

The Robbers Creek Biological Evaluation analysis determined that the No Action, Alternative 2, **will not affect the marten** population or individuals (**WNA**). While the No Action alternative would have no immediate direct or indirect effects to marten, risks to habitat alteration in the event of a wildfire are imminent. Wildfire is an uncertain risk that may or may not occur in the Robbers Creek watershed area for some time. However, the lack of fire for over 100 years leaves the project area vulnerable to larger patches of high severity fire.

Cumulative Effects

By definition, there would be no cumulative effects (40 CFR 1508.7) as a result of the No Action Alternative, since there are no direct or indirect effects. However, current habitat trends would continue into the reasonably foreseeable future, compounding past and present actions.

Management Indicator Species

Management Indicator Species (MIS) for the LNF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 24. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Robbers Creek Project (4th column).

Table 24: Selection of MIS for Project-Level Habitat Analysis for the Robbers Creek Project.

| Habitat or Ecosystem Component | CWHR Type(s) defining the habitat or ecosystem component ¹ | Sierra Nevada Forests Management Indicator Species <i>Scientific Name</i> | Category for Project Analysis ² |
|--|---|--|--|
| Riverine & Lacustrine | lacustrine (LAC) and riverine (RIV) | aquatic macroinvertebrates | 3 |
| Shrubland (west-slope chaparral types) | montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC) | fox sparrow <i>Passerella iliaca</i> | 3 |
| Sagebrush | Sagebrush (SGB) | greater sage-grouse <i>Centrocercus urophasianus</i> | 1 |
| Oak-associated Hardwood & Hardwood/conifer | montane hardwood (MHW), montane hardwood-conifer (MHC) | mule deer <i>Odocoileus hemionus</i> | 1 |
| Riparian | montane riparian (MRI), valley foothill riparian (VRI) | yellow warbler <i>Dendroica petechia</i> | 3 |
| Wet Meadow | Wet meadow (WTM), freshwater emergent wetland (FEW) | Pacific tree (chorus) frog <i>Pseudacris regilla</i> | 3 |
| Early Seral Coniferous Forest | ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), Jeffrey pine (JPN), tree sizes 1, 2, and 3, all canopy closures | Mountain quail <i>Oreortyx pictus</i> | 3 |
| Mid Seral Coniferous Forest | ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), Jeffrey pine (JPN), tree size 4, all canopy closures | Mountain quail <i>Oreortyx pictus</i> | 3 |
| Late Seral Open Canopy Coniferous Forest | ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P | Sooty (blue) grouse <i>Dendragapus obscurus</i> | 3 |
| Late Seral Closed Canopy Coniferous Forest | ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6. | California spotted owl <i>Strix occidentalis occidentalis</i> | 3 |
| | | Pacific marten <i>Martes caurina</i> ³ | |
| | | northern flying squirrel <i>Glaucomys sabrinus</i> | |
| Snags in Green Forest | Medium and large snags in green forest | hairy woodpecker <i>Picoides villosus</i> | 3 |
| Snags in Burned Forest | Medium and large snags in burned forest (stand-replacing fire) | black-backed woodpecker <i>Picoides arcticus</i> | 1 |

¹ All CWHR size classes and canopy closures are included unless otherwise specified; dbh = diameter at breast height; Canopy Closure classifications: S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); Tree size classes: 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

² Category 1: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

³ Identified as American Marten (*Martes americana*) in original MIS designation. Later classified as a separate species by Dawson and Cook (2012).

The MIS whose habitat would be either directly or indirectly affected by the Robbers Creek Project, identified as Category 3 in Table 24, are presented in the Robbers Creek Watershed Restoration Project Management Indicator Species Report which evaluates the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Robbers Creek Project are: aquatic macroinvertebrates, fox sparrow, yellow warbler, Pacific tree (chorus) frog, mountain quail, sooty grouse, California spotted owl, Pacific marten, northern flying squirrel, and hairy woodpecker. Table 25 summarizes the pre and post treatment acres of MIS species habitat. While the proposed action may affect MIS habitat, the relationship of project-level habitat impacts to the habitat trends at the bioregional-scale is negligible for each of the category 3 MIS species habitat.

Table 25: Summary of Pre- and Post-treatment Terrestrial MIS Habitat Acres

| MIS Habitat Type | Pre-treatment MIS Habitat – Acres (same as No Action) | Post Treatment MIS Habitat – Acres – Alt. 1 | Change in MIS Habitat Acres |
|--|---|---|-----------------------------|
| Riverine and Lacustrine | 36 | 36 | 0 |
| Shrubland | 73 | 73 | 0 |
| Riparian | 90 | 98 | +8 |
| Wet Meadow | 316 | 537 | +220 |
| Coniferous Forest, early seral | 93 | 62 | -31 |
| Coniferous Forest, mid seral | 3228 | 3118 | -110 |
| Coniferous Forest, late seral, open canopy | 21 | 90 | +69 |
| Coniferous Forest, late seral, closed canopy | 68 | 134 | +65 |
| CWHR not included in MIS Habitat | 1154 | 933 | -222 |

Fuels

Environmental Consequences

Alternative 1 – Proposed Action

Direct and Indirect Effects

Wildfire Regiment

Mechanical treatments will reduce canopy bulk densities and increase the separation between tree crowns. Mechanical treatments and hand thinning activities will increase canopy base heights and reduce ladder fuels. Prescribed fire will reduce residual ladder fuels and surface fuel loading.

Air Quality

Localized, short-term impacts like reduced visibility from smoke and associated particulate matter from the proposed prescribed fire treatments would be expected.

Short-term production of smoke and associated emissions would occur during prescribed burning in the project area. Potential localized effects in adjacent areas would be reduced visibility and lingering smoke on cold mornings. However, daily coordination among local fire management officials, adherence to the Smoke Management Plan and the daily determination of smoke transport conditions by California Air Resources Board would ensure that the smoke and related emissions for the proposed prescribed fire activities would stay within the standards of the Clean Air Act.

Prescribed fires are documented and tracked in the Prescribed Fire Information and Reporting System (PFIRS). PFIRS is administered by CARB. PFIRS and Smoke Coordination Conference Calls (SMCC) will provide an additional layer of coordination and tracking to help regulate daily smoke emissions from various local land management agencies and agricultural burners conducting burn projects in the area.

Cumulative Effects

Wildfire Regime

Research indicates that when mechanical treatments were followed by prescribed burning or pile burning, they were the most effective treatment for reducing crown fire potential and predicted tree mortality because of low surface fuel loads and increased vertical and horizontal canopy separation. Treatments that combined mechanical plus prescribed fire, had a substantially lower likelihood of passive crown fire as indicated by the very high torching indices (Stephens and others 2009; North et al. 2009). Results indicate that mechanical thinning using whole tree harvest systems followed by prescribed fire are effective at reducing potential fire severity and intensity under severe fire weather conditions.

The proposed treatments would reduce passive torching and crowning type fire behavior to low-moderate intensity surface fire behavior in all stands. As a result, the probability of torching would be reduced. Required wind speeds to induce torching on the overstory components would increase, thus maintaining more manageable fire behavior under increasing wind conditions. Flame lengths would be reduced. The potential mortality on the overstory trees would be reduced in all areas.

Air Quality

Treatment of fuels under this project would result in decreased smoke production and associated emissions in the event of a wildfire. This decrease would result in improved conditions for nuisance smoke and reduce the associated health impacts of humans in nearby communities.

Alternative 2 – No Action Alternative

Direct and Indirect Effects

Direct and indirect effects (40 CFR 1508.8) result from an action; therefore, there would be no direct or indirect effects as a result of the No Action Alternative. However, the no action alternative maintains the existing condition which is vulnerable to high severity wildfire. The No Action Alternative would forgo the opportunity to both recover wildfire resilient forests and reduce the impacts of smoke production and associated emissions in the event of a wildfire.

Cumulative Effects

By definition, there would be no cumulative effects (40 CFR 1508.7) as a result of the No Action Alternative, since there are no direct or indirect effects. The No action alternative would maintain forests vulnerable to high severity wildfire.

Transportation

Environmental Consequences

Alternative 1: Proposed Action

Direct and Indirect Effects

For the short term during the sale contract, depending on the length and timing of the project, there would be potential of erosion from the construction and reconstructions of NFS roads. There would be standard provisions in the contracts to require erosion control measures in case seasonal closures are needed.

In the short term there would be a direct effect of increasing traffic due to the movement of equipment, materials and personnel into and out of the project area. Increased traffic can impact the safety of the public and employees using the roads in the area. Traffic management and control measures would minimize these impacts. With the use of standard contract provisions for traffic control, effects would be negligible. Intersection sight distances along A21 were evaluated and were found to be adequate with many exceeding requirements.

A well-managed and maintained road system provides for safe and efficient public access and firefighter safety. The road maintenance activities proposed would improve both public access and firefighter safety. There is a risk of remnants of temporary roads used for this project being left open and to receive continued motorized vehicle use once the project is complete. Standard contract provisions will address the issue and ensure the roads are decommissioned.

There is a meadow along the first mile of 32N07 of which aggregate surfacing from the roadway has begun to encroach. Through reconstruction, larger surfacing aggregate placed on the roadway will help alleviate the issue and prevent roadway surfacing from draining off the roadway during large storm events.

The first part of 30N61 from A21 to Swain's meadow is a historical trail and a system road. Care should be taken for any road work and an archeologist consulted. The trail should be preserved yet at the same time the system road should be maintained to handle haul and vehicle traffic.

Cumulative Effects

All past actions have led to the existing transportation system which include county roads, NFS roads, non-system roads on National Forest land, and roads located on private land which are owned and operated by timber management companies. The proposed transportation actions, road maintenance, and road related watershed improvements would create a more efficient road system providing the necessary access for project implementation, future management, fire suppression, and improved public access. Active management of the official transportation system will minimize adverse environmental effects and reduce future maintenance costs.

Alternative 2: No Action

Direct, Indirect, and Cumulative Effects

Under this Alternative, no treatments would be performed and the existing road system within the project area would remain as is. There will be no direct or cumulative effects. Supplemental funds generated by the project would not occur to help the currently under-funded forest road maintenance program. Roads would continue to deteriorate through use by high clearance vehicles, off-highway vehicles (OHV), etc. without concurrent maintenance and upkeep. Non-system roads would remain physically open and would continue to cause resource damage through erosion and improper drainage.

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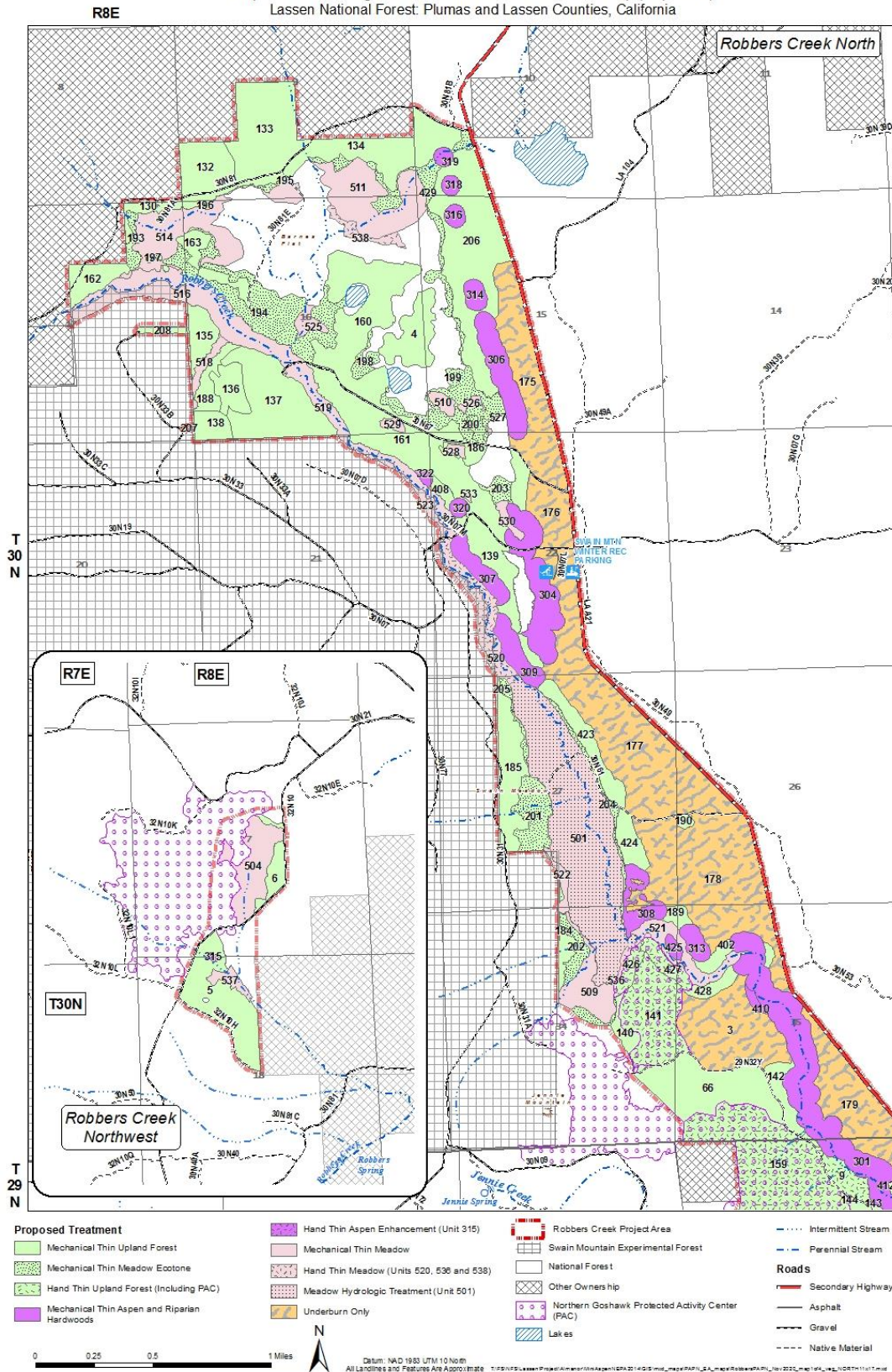
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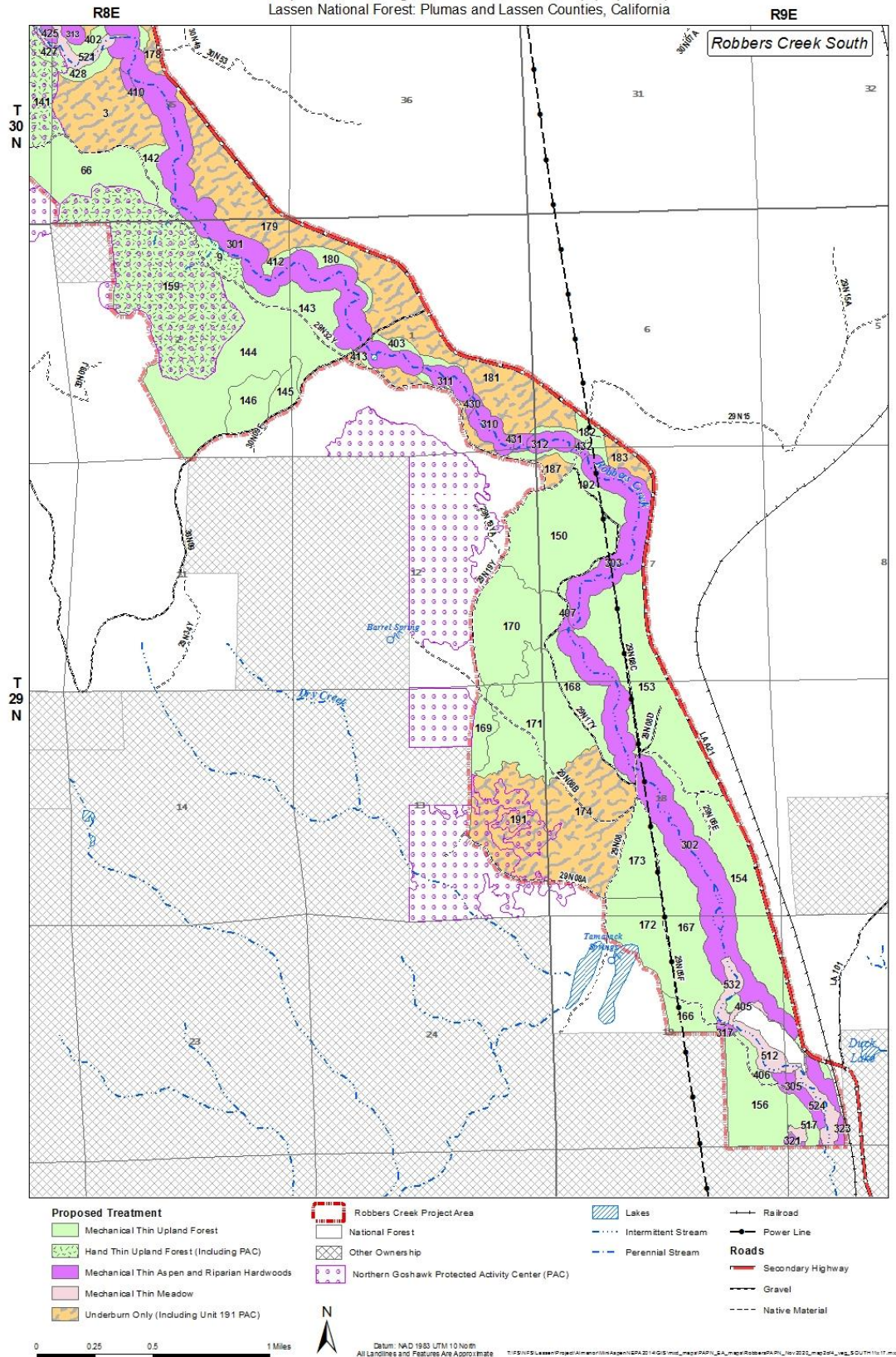
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Appendix A – Maps

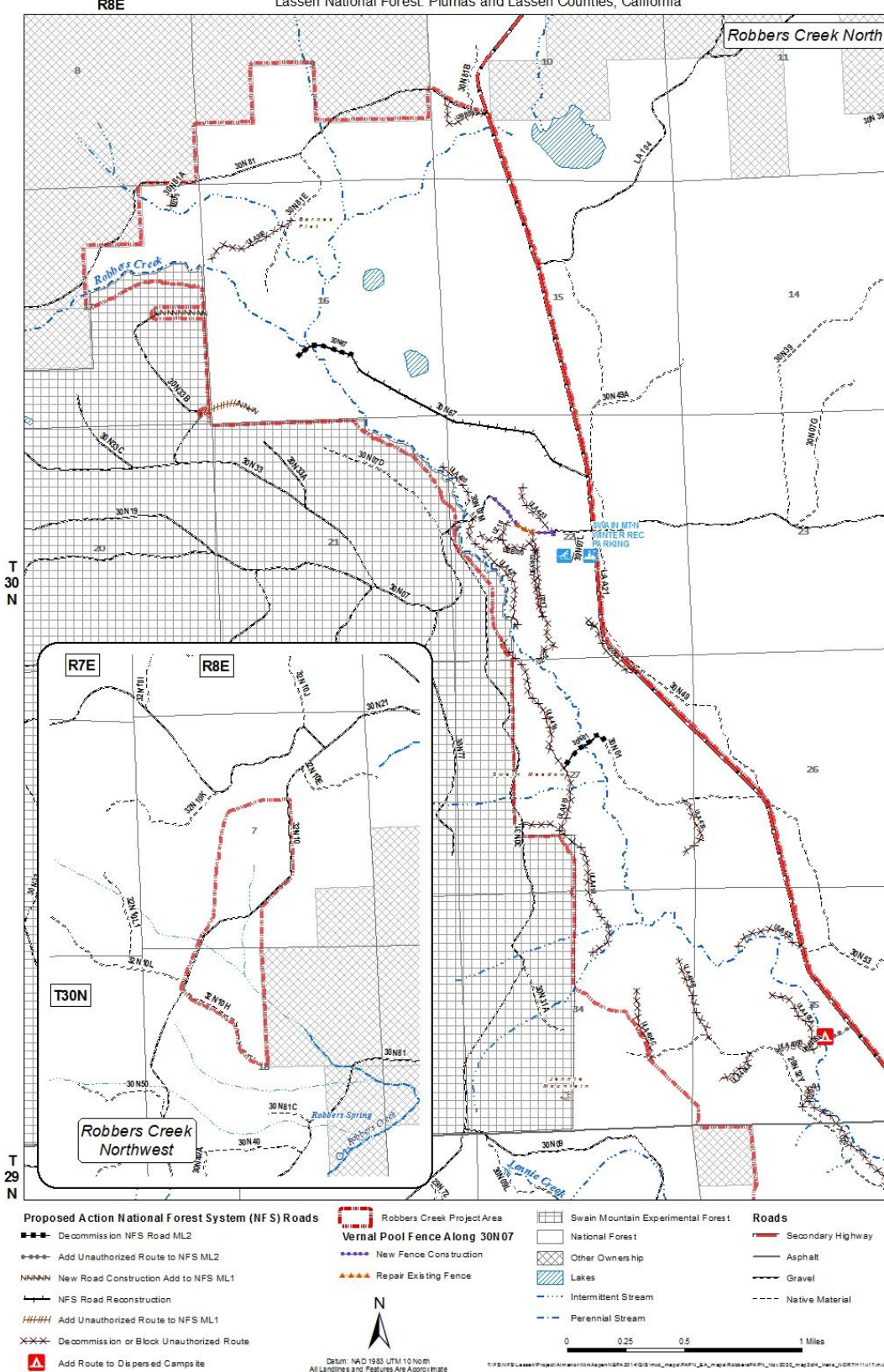
Robbers Creek Watershed Restoration Project November 2020
 Proposed Action - Vegetation Treatment North & Northwest Map (Map 1 of 4)
 Lassen National Forest: Plumas and Lassen Counties, California



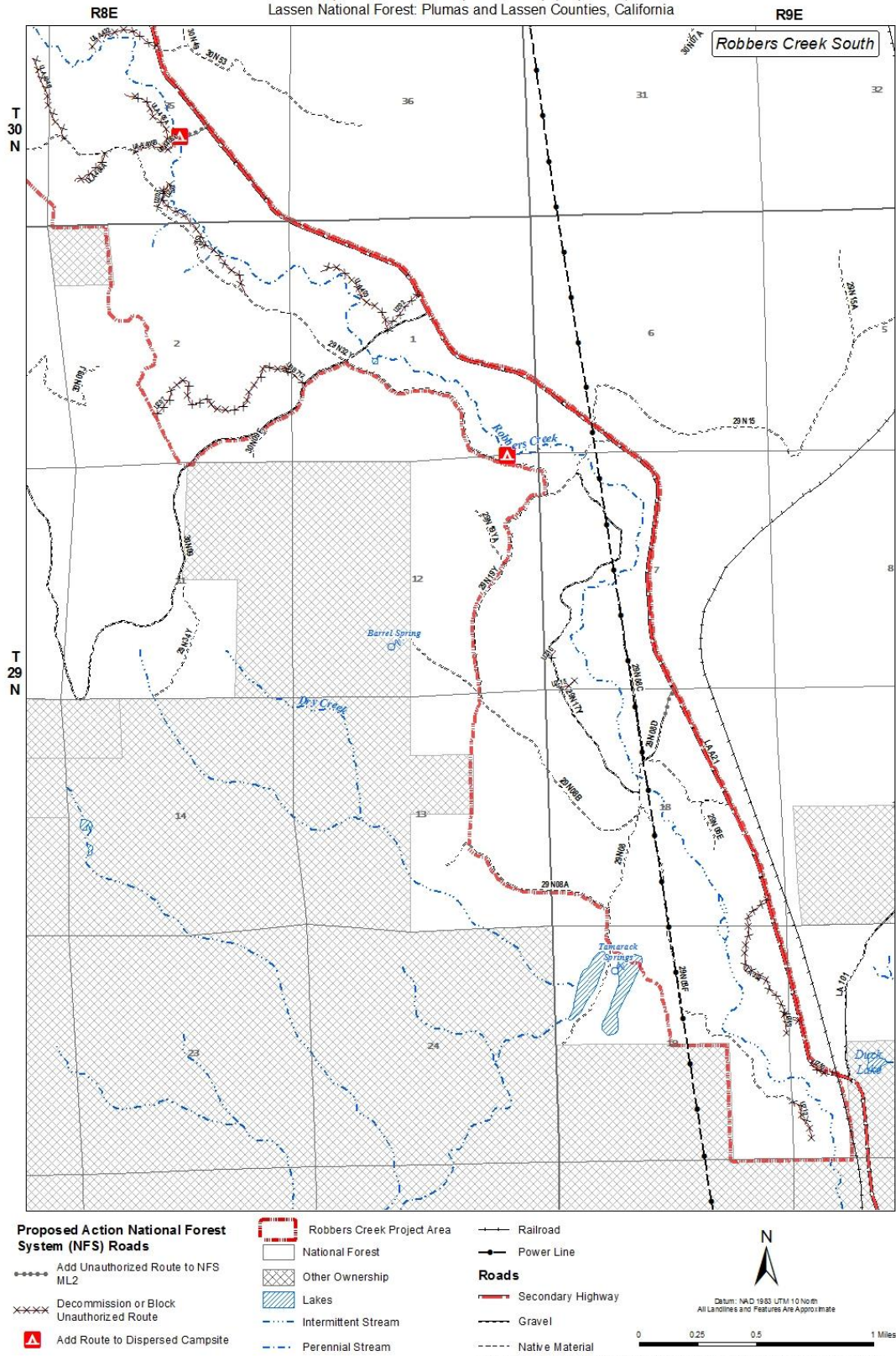
Robbers Creek Watershed Restoration Project November 2020
Proposed Action - Vegetation Treatment South Map (Map 2 of 4)
Lassen National Forest: Plumas and Lassen Counties, California



Robbers Creek Watershed Restoration Project November 2020
Proposed Action - Transportation Map (Map 3 of 4)
Lassen National Forest: Plumas and Lassen Counties, California



Robbers Creek Watershed Restoration Project November 2020
 Proposed Action - Transportation Map (Map 4 of 4)
 Lassen National Forest: Plumas and Lassen Counties, California



Appendix B - Integrated Design Features

The following integrated design features are resource protection measures that are developed by specialists and incorporated as part of the action alternative for the project. They are project-specific and are in addition to Best Management Practices (BMP) and standards and guidelines from the Lassen LRMP, as amended. These design features are also included to provide implementation parameters that would be incorporated into treatments, contracts, or used to guide forest service personnel in conducting implementation activities.

Aquatics and Watershed:

Riparian Conservation Areas

Equipment restriction zones would be established within Riparian Conservation Areas (RCAs) measured from the edge of the stream channel or aquatic feature (**Table**). Equipment would be permitted to reach beyond mechanical restriction zone boundaries into the RCA, but not allowed to enter. RCA widths and mechanical restriction zones would be as follows: Note: In limited instances where equipment is needed to create desired condition, mechanical equipment exclusion zones may be modified with the approval of a qualified specialist.

Table A-1: RCA widths and overview of mechanical restriction zones (measured from the edge of the aquatic feature)

| Aquatic Feature | RCA width | Ground-based mechanical equipment exclusion zone | | Burning | |
|--|-----------|--|--------------------------|---|--|
| | | Slope 20% or less | Slope greater than 20% | Piles (distance from riparian vegetation) | Underburn Ignition (distance from aquatic feature) |
| Perennial stream | 300 feet | 25 feet (except units 307 and 309) | 150 feet | 25 feet | 50 feet |
| Seasonal stream | 150 feet | 10 feet | 50 feet | 25 feet | 50 feet |
| Lake, wetland, wet meadow | 300 feet | No distance exclusion zone* see IDF 63 pg. 91 | | 25 feet (except unit 504) | variable (see IDFs) |
| Springs | 300 feet | 10 feet | 50 feet | 25 feet | 50 feet |
| Fen | 300 feet | 150 feet | 150 feet | 150 feet | 150 feet |
| Swain Vernal Pool (see IDFs for additional restrictions) | 300 feet | 50 feet for slopes <10% | 300 feet for slopes >10% | 50 feet where slopes are <10%, 300 feet where slopes are >10% | 300 feet |
| Other Vernal Pools | 300 feet | 10 feet | 50 Feet | 25 feet | 50 feet |

1. Hand felling within the RCA, including within the mechanical restriction zone, would be permitted.
2. Riparian species (aspen, cottonwood, alder, willow, dogwood, etc.) would not be cut or removed except where needed to construct BDAs in Swain Meadow.
3. Stream bank stability trees would be identified by a qualified specialist prior to RCA treatments. Stream bank stability trees would not be felled unless they pose a safety risk, in which case they would be felled and left in place.
4. Turning of mechanical equipment within RCA would be kept to a minimum.
5. There would be no crossing of perennial streams by mechanical equipment. Crossings of seasonal stream channels would be designated by a qualified specialist prior to implementation. Following use of these specified crossings, a qualified specialist would assess the site for potential repair and/or restoration needed.
6. Skid trails within RCAs would be kept to a minimum. No waterbars would be installed on skid trails within RCAs following treatment.
7. Skid trails within RCAs would require 90 percent ground cover following project implementation.
8. Mechanical equipment would be permitted within 25ft of the riparian vegetation along the existing unauthorized route within units 307 and 309 (see map 1 of 4).
9. No cut and fill would be allowed for new skid trails within RCAs.
10. Where mechanical equipment is used to fell timber within RCAs, one-end suspension would be used to remove felled timber where feasible. If one-end suspension is not feasible, endlining would be permitted as long as objectives for 90 percent groundcover on non-rocky riparian soils are met.
11. End-lining of material would be permitted within RCAs with slopes greater than 20 percent but would not be permitted within 25 feet of any continuous scour channels.
12. No piling of material for burning would occur within 25 feet of an aquatic feature except in unit 504 (see inset map 1 of 4).
13. In unit 504 pile burning would be allowed within the aquatic feature (a wetter meadow), and the RCA, with piles no more than 10 feet in diameter and 5 feet high. No more than 10 percent of the aquatic feature would be covered in piles.
14. If piles for burning cover more than 10 percent of the RCA in a unit, only one-third of the piles would be burned in any given year to avoid impacting the nearby riparian environment.
15. There would be no construction of new landings or use of old or existing landings within an RCA without concurrence by a qualified specialist. Landings would not be within 25 feet of the existing riparian or meadow vegetation. Landings within RCAs would be decommissioned following project implementation and a qualified specialist would evaluate them for compaction or erosion potential. Mitigations may include obliteration of the landing, spreading of native seed, mulch, woody debris, or certified weed-free straw.
16. Any wood placement in stream channels would be at the discretion of a watershed or aquatics specialist.
17. Keep the skidded length to a minimum within RCAs.

Water Drafting

18. If streamflow is greater than or equal to 4.0 cubic feet per second, the water drafting rate should not exceed 350 gallons per minute.
19. If streamflow is less than 4.0 cubic feet per second, the water drafting rate should not exceed 20 percent of the streamflow.
20. Water drafting would cease when bypass surface flows drop below 2.0 cubic feet per second.

Botany

*Swain Vernal Pool RCA (*Orcuttia tenuis*, units 139, 177, 304, 307, 309, see map 1 of 4)*

21. No mechanical treatments, skid trails, or end lining would occur within 50 ft. of the Swain Vernal

- Pool edge, although equipment could reach in. Hand treatments would be permitted. Over snow logging would be used if possible, but not required. The pool would be displayed as a control area on contract maps. Trees would be directionally felled away from Swain Vernal Pool.
22. Trees would be retained within 10 ft. of the southern shoulder of Road 30N07 where practicable.
 23. No mechanical treatments would occur on slopes >10% within the Swain Vernal Pool RCA (300 ft.)
 24. No hand piles would be constructed within 50 ft. of the vernal pool edge or on slopes greater than 10% within the Swain Vernal Pool RCA (300 ft.).
 25. No landings would be located within the Swain Vernal Pool RCA (300 ft.)
 26. No main skid trails would be constructed within 100 ft. of the vernal pool edge, or on slopes greater than 20% within the Swain Vernal Pool RCA (300 ft.). Skid trails running parallel to the Swain Vernal Pool edge would be minimized. Skid trails within this RCA would be approved by the sale administrator prior to operations.
 27. Spring burning would be permitted prior to pool drying, however no ignition would occur within the Swain Vernal Pool RCA.
 28. Non-system route decommissioning activities would be excluded from Swain Vernal Pool. Within the Swain Vernal Pool RCA (300 ft.), decommissioning activities may include boulder or slash placement.

Sensitive and Special Interest Plant Species

29. The occurrence of *Botrychium minganense* (BOMI-033) in Unit 5 would be protected through flag-and-avoid methods and would exclude project activities within 25 feet. Trees would be directionally felled away from the occurrence. Locations would be displayed as control areas on all contract maps.
30. Live vegetation and snags would be retained within 150 ft. of Bandit Fen, and this location would be displayed as a control area on contract maps.
31. Occurrences of *Silene occidentalis* ssp. *occidentalis* (SIOCO-007, SIOCO-008) would be flagged and avoided by mechanical thinning, hand piling and pile burning activities. Hand-thinning could occur within occurrences, and mechanical equipment could reach in from edges (Unit 302, Unit 309).
32. Within sub-occurrences of *Carex davyi* less than two acres in size (CADA2-005, CADA2-009, CADA2-010, CADA2-011, CADA2-012, CADA2-013), mechanical equipment, hand-piling, prescribed fire ignition and pile burning activities would be excluded, but hand-thinning could occur and mechanical equipment could reach in from edges (Units 130, 160, 161, 186, 302, 514, 516, 525, 527, 530). CADA2-015 occurs within the RCA associated with Swain Vernal Pool (Units 139, 304), and would not have any additional restrictions other than those described for the Swain Vernal Pool RCA. Mechanical equipment would be permitted within an occurrence larger than two acres in size (CADA2-008, Units 134, 160, 319, 429, 511). Prescribed fire would be permitted in all occurrences.
33. Trees greater than 15 inches DBH would be retained within the limit's operability in all occurrences of *Carex davyi*.
34. Vehicular traffic would be restricted to channels within occurrences of *Castilleja lassenensis* and *Botrychium simplex* in Swain Meadow (CALA45-003, BOSI-012).
35. Sod removal associated with riffle augmentation in Swain Meadow would not occur within occurrences of *Castilleja lassenensis* or *Botrychium simplex* (CALA45-003, BOSI-012).
36. Mechanical equipment would be excluded from all occurrences of *Castilleja lassenensis*, but where practicable in Unit 501 (Swain Meadow). Hand-thinning would be permitted within occurrences, but piles would be placed 25 ft. from occurrences or lopped and scattered 25 ft. from occurrences. (Unit 511, Unit 514, Unit 519, Unit 538)

37. Prescribed fire would not be ignited, and fireline would not be constructed within occurrences of *Botrychium* species or *Castilleja lasenensis*, although fire would be allowed to back into these areas.
38. Borrow pit construction would be excluded from occurrences of *Castilleja lasenensis*.
39. New occurrences of threatened, endangered, or sensitive (TES) plant species as well as fens discovered before or during ground-disturbing activities will be addressed as with species-specific protection measures similar to those described above.

Invasive Plant Species

40. All off-road equipment would be weed-free prior to entering the Forest. Staging of equipment would be done in weed free areas.
41. Known invasive plant infestations would be identified, flagged where possible, and mapped for this project. Locations would be displayed on contract maps. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) by forest botany staff prior to project implementation. Any larger or un-pullable infestations would be avoided by harvesting equipment to prevent spreading weeds within the project.
42. New small infestations identified during project implementation would be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations are identified after implementation, they would be isolated and avoided by equipment, or equipment used would be washed after leaving the infested area and before entering an un-infested area.
43. Post project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible and for a period of multiple years after completion of the project.

Cultural Resources

Cultural Resource protection is managed through the Programmatic Agreement (PA) among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Processes for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region (2013).

Cultural Resources within the Robbers Creeks project area of potential effect (APE) would be protected during project implementation utilizing the following Approved Standard Protection Measures:

44. Proposed undertakings shall avoid historic properties. Avoidance means that no activities associated with undertakings that may affect historic properties, unless specifically identified in this PA, shall occur within historic property boundaries, including any defined buffer zones.
45. Activities within historic property boundaries will be prohibited with the exception of using developed Forest transportation systems when the Heritage Program Manager (HPM) or qualified heritage professional recommends that such use is consistent with the terms and purposes of this agreement, where limited activities approved by the HPM will not have an adverse effect on historic properties or as accepted otherwise.
46. All historic properties within APEs shall be clearly delineated prior to implementing any associated activities that have the potential to affect historic properties.
 - a. Historic property boundaries shall be delineated with coded flagging and/or other effective marking.
 - b. Historic property location and boundary marking information shall be conveyed to appropriate Forest Service administrators of employees responsible for project implementation so that pertinent information can be incorporated into planning and

- implementation documents, contracts and permits.
47. Linear sites (e.g., historic trails, roads, railroad grades, ditches) may be crossed or breached by equipment in areas where their features or characteristics clearly lack historic integrity.
 - a. Crossings are not to be made at points of origin, intersection, or terminus of linear site features.
 - b. Crossings are to be made perpendicular to linear site features.
 - c. The remainder of the linear site is to be avoided, and traffic is to be clearly routed through designated crossings.
 48. Placement of foreign, non-archaeological material (e.g., padding or filter cloth) with transportation corridors over archaeological deposits or historic features to prevent surface and subsurface impacts caused by vehicles of equipment.
 - a. Engineering will design the foreign material depth to acceptable professional standards.
 - b. Engineering will design foreign material use to assure that there will be no surface or subsurface impacts to archaeological deposits or historic features.
 - c. The foreign material must be easily distinguished from underlying archaeological deposits.
 - d. The remainder of the archaeological site is to be avoided, and traffic is to be clearly routed across the foreign fill material.
 - e. The foreign material must be removable.
 - f. Indian tribe or other public concerns about the use of the foreign material will be addressed prior to use.

In addition to the programmatic agreement approved standard protection measures, the following measures would be utilized:

49. The project manager or sale administrator would walk historic property boundaries located within or near activity areas with operators before project implementation to insure protection.
50. Historic properties within or adjacent to planned treatment areas, activity areas, or roads would be monitored during and after project completion.
51. If heritage resources are identified during project implementation (unanticipated discovery) all work would cease immediately in that area until the situation is reviewed and an assessment and mitigation plan instituted to insure protection of the site.

Fuels

52. Hand and machine piles would not be placed in locations that would result in the mortality of surrounding trees when piles are ignited.
53. Machine and hand line would not be constructed within wet meadows.
54. Control lines would be rehabilitated after prescribed burning has been completed and declared out by the appropriate fire and fuels personnel, unless the control line is to be used in a subsequent prescribed burn.

Range

55. Coordination between project manager(s), range specialists, and the affected grazing permittee(s) would occur prior to implementation of project activities.
56. If meadow treatments require temporary livestock exclusion to meet management goals for prescribed burning or restoration, the activities would be staggered so that multiple allotment grazing areas would not be excluded from livestock at the same time (i.e., fenced, burned, rested, or other treatments).

57. Fencing, either temporary or permanent, would consider water availability and livestock trailing needs and movement patterns so as not to cause corridors, funneling or congestion between fences or other barriers.

Recreation/Special Uses

58. Trails and roads accessing dispersed camping areas and trailheads would be kept open and free of debris during implementation of treatments.
59. Designated trails and roads open to the public may be closed for periods of time during project activities to provide for public safety. The proper staff would be notified 14 days prior to closure periods.
60. Seasonal restrictions are in place for winter recreation (cross-country ski, snowmobile) from December 26 through March 31 annually for FS 30N07, FS 30N31, FS29N32Y, FS29N19YA, and FS 29N08B

Silviculture

61. Cut stumps of live conifers with a 14-inch stump diameter would be treated with an Environmental Protection Agency (EPA)-approved borate compound which is registered in California for the prevention of annosus root disease. No EPA-approved borate would be applied within 25 feet of known Sensitive and Special Interest Plants or within 25 feet of live streams, meadow/wetlands, and vernal pools.
62. All sugar pine identified as rust resistant or as a candidate for rust resistance would be protected. A \$20,000 fine would be imposed for each rust-resistant or candidate tree damaged during operations. Healthy sugar pine showing no observable signs of blister rust would be favorably retained.

Soils

63. Soils in the RCA and in meadow treatment areas would be dry to a depth of 10-inches prior to equipment entry. If over-snow treatments are utilized, snow conditions and depth would be sufficient to protect soils from compaction.
64. In treatment units outside of RCAs, soil moisture conditions would be evaluated using Forest-established visual indicators before equipment operation proceeds. Lassen National Forest (LNF) Wet Weather Operations and Wet Weather Haul Agreements would be followed to protect the soil and transportation resources.
65. Areal extent of detrimental soil disturbance in uplands would not exceed 15 percent of the area dedicated to growing vegetation. Following implementation, the mechanical treatment units would be evaluated by a qualified specialist to determine if detrimentally compacted ground exceeds the LNF Land and Resource Management Plan standard of 15 percent areal extent. If restoration is needed to achieve compliance, an appropriate subsoiler, ripper or other implement would be used to fracture the soil in place leaving it loose and friable.
66. In mechanical treatment units, landings within treated areas no longer needed for long-term management would be evaluated by a qualified specialist to determine whether remediation is needed to restore productivity and hydrologic function. If so, appropriate remediation would be implemented. Where landing construction involved cut and fill, the landing would be re-contoured to match the existing topography.
67. Machine piling operations would remove only enough material to accomplish project objectives and would minimize the amount of soil being pushed into burn piles. Duff and litter layers would remain as intact as possible, and the turning of equipment would be minimized. Piles would be constructed as tall as possible, within limits of safety and feasibility. A mixture of fuel sizes in each pile is preferred, avoiding piles of predominately large wood when practicable.
68. To the extent possible, existing landings and skid trails would be used.

69. Mechanical equipment would not operate on slopes greater than 35 percent. Mechanical harvesting would be allowed in unit 144 (see map 2 of 4) on slopes up to 45 percent. A qualified watershed specialist would be present to monitor initial implementation on slopes over 35 percent.
70. Where it exists, large woody material greater than 20 inches in diameter would be retained at a rate of at least five logs per acre.
71. If soil is removed from Forest Service land for use in the Swain meadow restoration it must be done in a manner that will not render the site unproductive. Topsoil will be stockpiled and then re-spread following subsoil removal, under direction of a qualified specialist.
72. Skid trails over 20% slope would have erosion control measures installed following guidelines for high erosion hazard soils.

Wildlife

Northern Goshawk

73. Existing goshawk protected activity centers (PAC) would be surveyed prior to treatments occurring in the PAC or within ¼ mile of the PAC.
74. A northern goshawk limited operating period (LOP) from February 15 to September 15 would be applied within ¼ mile of all goshawk PAC or within ¼ mile of a nest if a nest is confirmed. The LOP may be lifted if it is determined that the PAC is not occupied.
75. If a northern goshawk nest is found within any of the proposed treatment units, the nest would be protected through the placement of a new PAC or the realignment of an existing PAC boundary.

California Spotted Owls

76. Existing California spotted owl protected activity centers (PAC) would be surveyed prior to treatment and no treatment would occur within an existing or new owl PAC.
77. A California spotted owl LOP from March 1st to August 15th would apply to stands within ¼ mile from a spotted owl PAC unless surveys confirm that spotted owls are not nesting. The LOP would be lifted after surveys if no nesting spotted owls are confirmed.
78. If a California spotted owl nest is found within any of the proposed treatment units, the nest would be protected through the placement of a new PAC or the realignment of an existing PAC boundary.

Marten

79. If a marten den site is identified, a 100-acre area consisting of the highest quality habitat in a compact arrangement would be placed around the den site. The den site area would be protected from vegetation treatments with a limited operating period (LOP) from February 15 through July 31st as long as habitat remains suitable or until another Regionally-approved management strategy is implemented.
80. No mechanical treatment would be permitted within the 100-acre marten den site area regardless of time of year. Hand treatments may be permitted if existing desired conditions for suitable habitat are retained and timing of treatments abide by the LOP.
81. If a marten rest site (female or male) is found within a treatment unit, the rest site structure, (e.g., log, snag, tree) would be protected from being damaged during project implementation.

Fisher

82. If a fisher den site is identified, a 700-acre area consisting of the highest quality habitat in a compact arrangement would be placed around the den site. The den site area would be protected from

vegetation treatments with a limited operating period (LOP) from March 1st through June 30th as long as habitat remains suitable or until another Regionally-approved management strategy is implemented.

83. No mechanical treatment would be permitted within the 700-acre fisher den site area regardless of time of year. Prescribed burning or other treatments may be permitted if existing desired conditions for suitable habitat are retained and timing of treatments abide by the LOP.
84. If a fisher rest site (female or male) is found within a treatment unit, the rest site structure, (e.g., log, snag, tree) would be protected from being damaged during project implementation.

Wolves

85. If a den or rendezvous site is found within 1 mile of project activities between March 15 and August 15th, the Forest Service Wildlife Biologist will work with CA Department of Fish and Wildlife and US Fish and Wildlife Service to implement appropriate mitigation measures

Snags and Down Logs

86. In addition to existing snag retention, defect trees (i.e. forked, broken or dead tops) would be retained when wildlife use is evident in the form of existing cavities and nest structures.
87. Between 10 and 15 tons per acre of large down logs (>12 inches in diameter and 6 feet in length) would be retained where it exists. Large log retention can be met with either existing logs; or trees 30 inches DBH and larger and snags cut for safety or operability that would be left on site.

Aspen and riparian hardwoods

88. All aspen and other riparian hardwood trees greater than 8 inches DBH would be protected during operations within the limits of safety and operability.
89. Landings would be placed outside of aspen stands where possible.
90. Burn piles would be placed a minimum of 25 feet away from aspen stems.

Appendix C - Past, Ongoing, and Reasonably Foreseeable Future Actions Report for the Robber's Creek Watershed Project

This report includes a description of the Past, Ongoing, and Reasonably Foreseeable Future Actions (PORFFA) that will be used in the analysis of cumulative effects for projects within the Robber's Creek project area on the Almanor Ranger District. This report summarizes the analysis area and the temporal scale (time) considered for cumulative effects within each project area. Each resource considered in each project has disclosed specific cumulative effects for that particular resource area. Refer to the applicable CE/EA sections and specialists' reports for a specific discussion of cumulative effects.

Scope of the Cumulative Effects Analysis (CEA) Area

The CEA area would be, at a minimum, the project area. In addition, some resources use a larger CEA area such as sub-watersheds. The time period used for including past actions is 30 years before present (1989-2019).

Past, Ongoing, and Reasonably Foreseeable Future Actions

The following list of cumulative effects actions are considered for the Robber's Creek project. Tables 2 and 3 summarize those past, ongoing, and reasonably foreseeable future actions, with a description of the activity and the acres or miles affected. Guidance on cumulative effects, particularly past actions, was considered based on Connaughton (2005), hereby incorporated by reference. All map feature locations are approximate. The following is a list of all the tables and figures presented in this document:

Figures

Figure 1: Hydrology CEA Area and Subwatersheds

Figure 2: Range CEA areas

Figures 3 and 4: Wildlife CEA areas

Figure 5: Past Actions (1990-1999)

Figure 6: Past Actions (2000-2009)

Figure 7: Past Actions (2010-2019)

Tables

Table 1: Acres summary

Table 2: Past activities

Table 3: Ongoing activities

Data for this analysis was compiled from district GIS and FACTS databases, district stand record cards, and resource specialists. Data for Timber Harvest Plans (THPs) and Nonindustrial Timber Management Plans (NTMP) on private lands in the analysis area were acquired from the California Department of Forestry and Fire Protection website at;

https://services1.arcgis.com/jUJYIo9tSA7EHvfZ/arcgis/rest/services/CALFIRE_THPS/FeatureServer/0

This cumulative effect analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach.

First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond) and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.”

The cumulative effects analysis in this environmental assessment is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

“CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonably foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making. (40 CFR 1508.7)”

For these reasons, the analysis of past actions in the Robber’s project and specialists’ reports is based on current environmental conditions.

Figure 1.

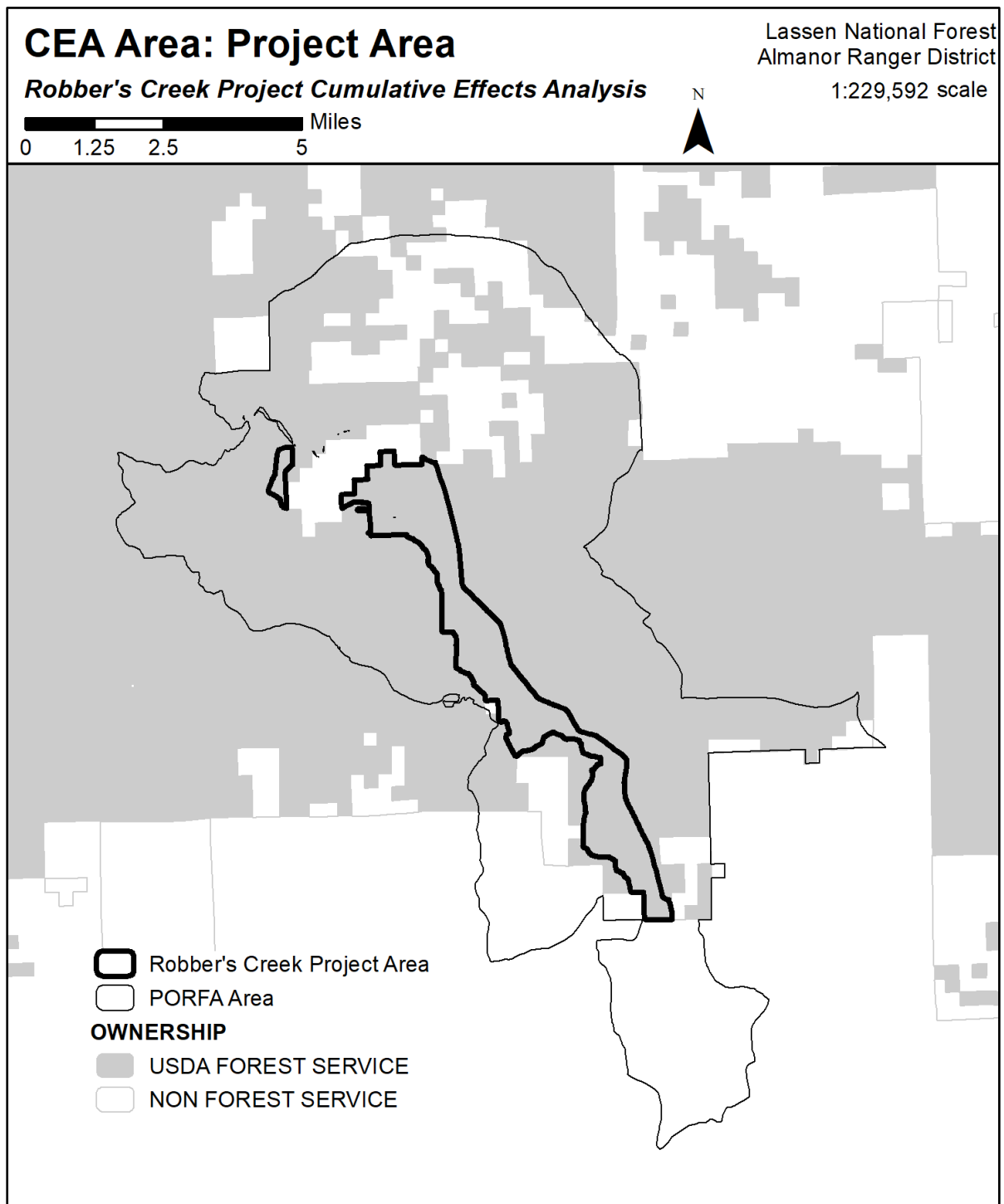


Figure 2.

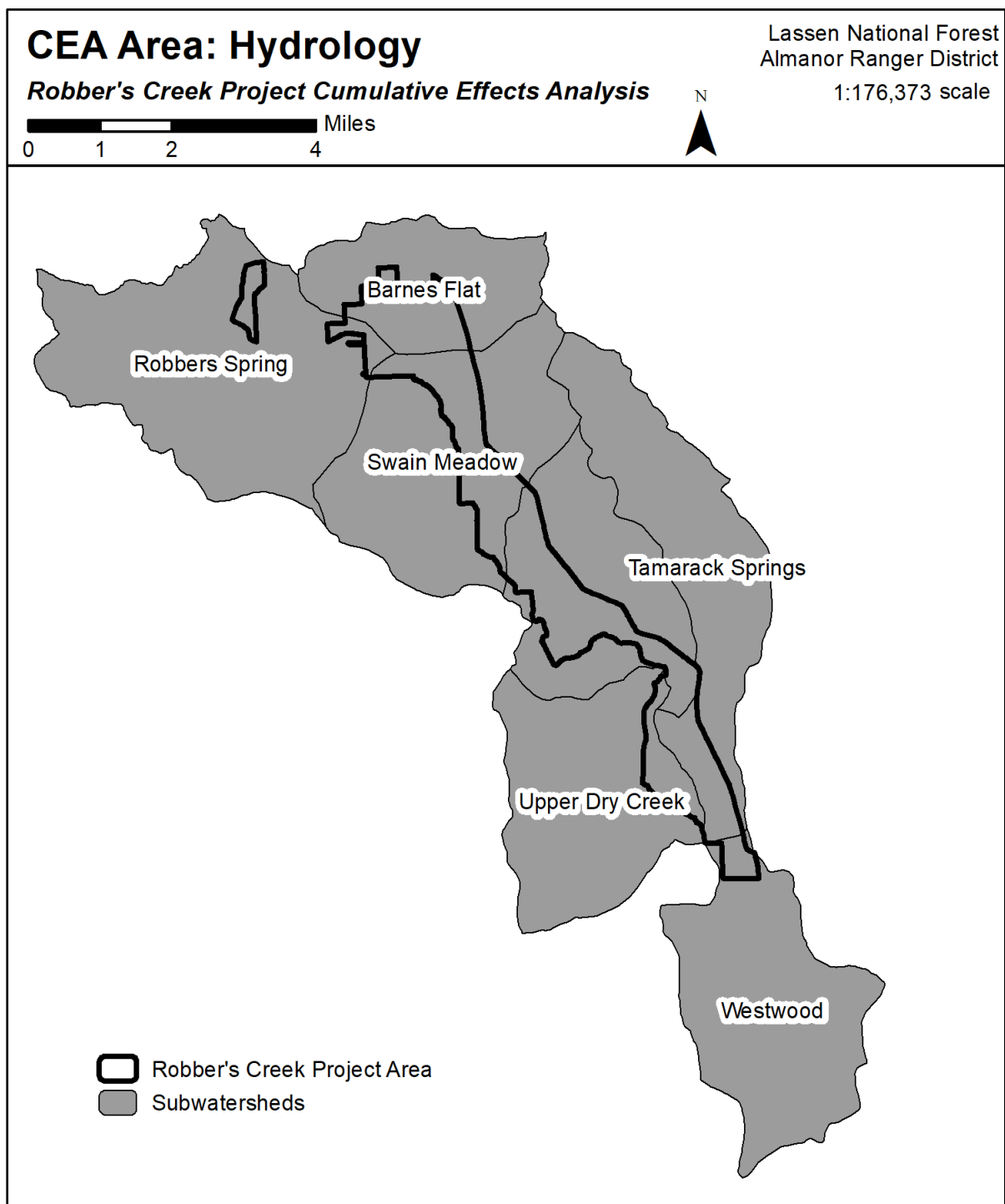


Figure 3.

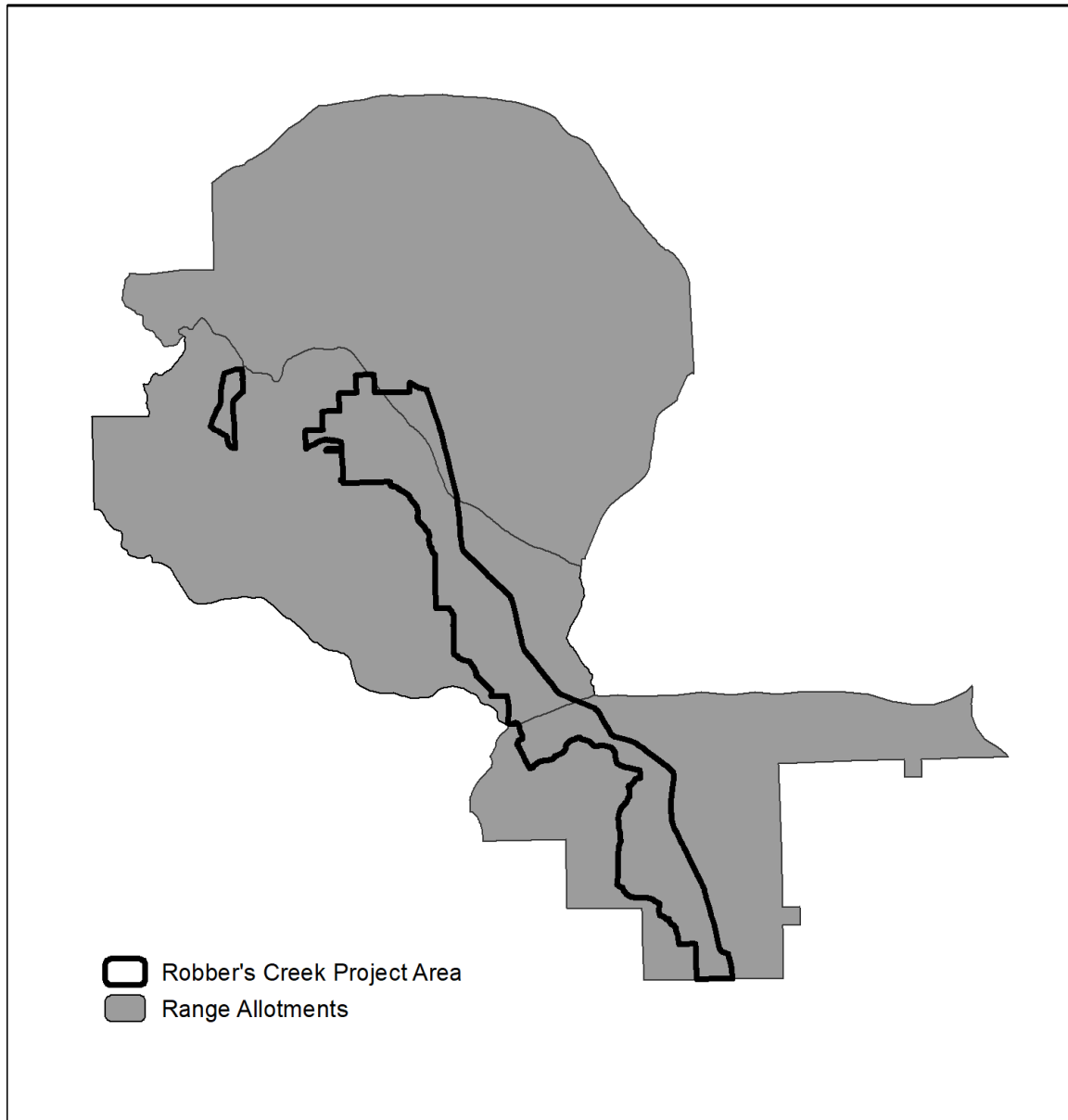
CEA Area: Range Allotments

Robber's Creek Project Cumulative Effects Analysis

Lassen National Forest
Almanor Ranger District

1:191,228 scale

0 1 2 4 Miles



| Table 1. Summary of CEA areas in acres. | | | | | | | | | | | | | |
|---|--------------|---------------|-----------------|--------------|------------------|-----------------|----------|---------|-------------------|------------------|-----------|----------------|----------------------|
| | Project Area | Subwatersheds | | | | | | | | Range Allotments | | | |
| | | Barnes Flat | Robber's Spring | Swain Meadow | Tamarack Springs | Upper Dry Creek | Westwood | Unknown | All Subwatersheds | Clover Valley | Duck Lake | Robber's Creek | All Range Allotments |
| Acres | 5075 | 3049 | 7304 | 5676 | 4891 | 4678 | 5054 | 4212 | 34864 | 19079 | 9977 | 13727 | 42783 |

| Table 2. Past Actions | | | | | | | | | | | | | | | |
|--------------------------------------|------|----------------|--------------|---------------|-----------------|--------------|------------------|-----------------|----------|---------|-------------------|------------------|-----------|----------------|----------------------|
| | | | | Subwatersheds | | | | | | | | Range Allotments | | | |
| Treatment Type | Year | Project Name | Project Area | Barnes Flat | Robber's Spring | Swain Meadow | Tamarack Springs | Upper Dry Creek | Westwood | Unknown | All Subwatersheds | Clover Valley | Duck Lake | Robber's Creek | All Range Allotments |
| Timber/Silviculture | | | | | | | | | | | | | | | |
| Site prep for planting/natural regen | 1994 | Feather | | | | | | | | | | 32 | | | 32 |
| | 1994 | Jennie | | | | | | | | 47 | 47 | | 47 | | 47 |
| | 1994 | Betty Sue | 27 | | | 27 | | | | | 27 | 1 | | 27 | 28 |
| | 2000 | Pegleg | | | | | | | | | | | 68 | | 68 |
| | 2001 | Swain WT | | | 149 | 10 | | | | | 159 | | | 159 | 159 |
| | 2004 | Pegleg | | 5 | | 13 | 96 | | | 32 | 146 | 66 | 113 | 21 | 200 |
| | 2014 | Willow Springs | | | | | | | | | | 4 | | | 4 |
| Commercial Thin | 1990 | Lasco | | | | | 1181 | | | 125 | 1306 | 14 | | 1 | 15 |
| | 1991 | Lasco | | | | | 1941 | | | 233 | 2174 | | 789 | 1 | 790 |
| | 1994 | Unknown | | | 38 | | | | | | 38 | | | 38 | 38 |
| | 1998 | Bailey | 45 | | 117 | | | | | | 117 | 10 | | 111 | 121 |
| | 1998 | Kobets | | | | 173 | 174 | | | | 347 | 783 | | | 783 |
| | 1998 | Robber's | 30 | | | | | 244 | | 162 | 406 | | 403 | | 403 |
| | 1999 | Norvell | | | | | | | | | | 6 | | | 6 |
| | 2000 | Norvell | | | | | | | | | | 6 | | | 6 |
| | 2000 | Caribou | 13 | 179 | | | | | | | 179 | 464 | | | 464 |
| | 2001 | Robber's | | | | 2 | | | | | 2 | | | | |
| | 2005 | Long DFPZ | | | | | | | | | | 67 | | | 67 |

| | | | | | | | | | | | | | | | |
|-----------------|------|----------------|------|-----|----|-----|-----|----|----|-----|-----|-----|------|-----|------|
| | 2005 | Bizz DFPZ | | | | | | | 12 | | 12 | | | 558 | 558 |
| | 2005 | Pegleg | | | | 70 | 130 | | | 585 | 785 | | 481 | | 481 |
| | 2006 | Silver DFPZ | | | | | | | | | | 21 | | | 21 |
| | 2008 | Robber's | 873 | 79 | | 237 | | 12 | | 662 | 990 | 132 | 349 | 508 | 989 |
| | 2009 | Pegleg DFPZ | | 123 | | 102 | | | | | 225 | 240 | | 20 | 260 |
| | 2011 | Pegleg DFPZ | | | | 332 | 187 | | | 13 | 532 | 348 | | 170 | 518 |
| | 2013 | Willow Springs | | | | | | | | | | 56 | | | 56 |
| | 2014 | Pegleg | | | | | | | | | | | 20 | | 20 |
| | 2016 | Swain Mountain | 2 | | | 89 | | | | | 89 | | | 89 | 89 |
| | 2017 | Swain Mountain | | | 39 | | | | | | 39 | | | 34 | 34 |
| | 2018 | Swain Mountain | | | 39 | 270 | | | | | 309 | | | 269 | 269 |
| Coppice Cut | 2018 | Swain Mountain | | | 26 | | | | | | 26 | | | 26 | 26 |
| ITS/OSR | 1990 | Westwood | | | | | | | | | | 2 | | | 2 |
| | 1992 | Betty Sue | 1447 | | | | 642 | | 71 | 142 | 855 | | 1699 | | 1699 |
| | 1993 | Echo | | | 13 | | | | | | 13 | | | 13 | 13 |
| | 1993 | Feather | | | | | | | | | | 32 | | | 32 |
| | 2004 | Betty Sue | | | | | | | | | | 182 | | | 182 |
| | 2005 | Bizz DFPZ | | | | | | | | | | | 5 | | 5 |
| | 2005 | Long DFPZ | | | | | | | | | | 3 | | | 3 |
| | 2014 | Mooney | | | | | | | | | | 2 | | | 2 |
| Group Selection | 2002 | Pegleg | | 5 | | 4 | 27 | | | | 36 | 56 | 13 | | 69 |
| | 2004 | Pegleg | | | | 10 | 72 | | | 34 | 116 | 10 | 111 | 23 | 144 |
| | 2013 | Willow Springs | | | | | | | | | | 4 | | | 4 |
| | 2018 | Swain Mountain | | | | 79 | | | | | 79 | | | 79 | 79 |
| Sanitation Cut | 1989 | Unknown | | | | | | | | | | 283 | | | 283 |
| | 1993 | Unknown | | | | | | | | | | 283 | | | 283 |

| | | | | | | | | | | | | | | | |
|-------------------------|------|----------------|------|-----|-----|------|-----|-----|----|------|------|-----|------|------|------|
| | 1998 | Star WT SSTS | 2453 | 518 | | 1025 | | 604 | | 1981 | 4128 | 538 | 1702 | 1875 | 4115 |
| | 2000 | Caribou | 9 | 155 | | | | | | | 155 | 440 | | | 440 |
| | 2003 | Betty Sue | | | | | | | | | | 283 | | | 283 |
| Seed-tree Cut | 1989 | Betty Sue | | | | | | | | | | 283 | | | 283 |
| | 1990 | Betty Sue | | | | | | | | | | 181 | | | 181 |
| | 1992 | Betty Sue | 124 | | | 124 | | 843 | | | 967 | 1 | | 123 | 124 |
| | 1998 | Betty Sue | | | | | | | | | | 283 | | | 283 |
| | 2005 | Betty Sue | | | | | | | | | | 283 | | | 283 |
| | 2015 | Betty Sue | | | | | | | | | | 283 | | | 283 |
| | | | | | | | | | | | | | | | |
| Clear Cut | 1992 | Jennie | | | | | | | | 47 | 47 | | 47 | 97 | 144 |
| | 1992 | Betty Sue | 97 | | | 97 | | | | | 97 | | | | |
| | 1993 | Echo | 78 | 65 | 111 | | | | | | 176 | | | 176 | 176 |
| Permanent Land Clearing | 2013 | Swain Mountain | | | | 5 | | | | | 5 | | | 5 | 5 |
| Fire/Fuels | | | | | | | | | | | | | | | |
| Underburn | 2009 | Betty Sue | 455 | | | | 108 | 348 | | 7 | 463 | | 462 | | 462 |
| | 2011 | Bizz DFPZ | | | | | | | | | | | 481 | | 481 |
| Pile burn | 2006 | Silver DFPZ | | | | | | | | | | 27 | | | 27 |
| | 2006 | Long DFPZ | | | | | | | | | | 67 | | | 67 |
| | 2006 | Robber's | | | | 3 | | | | | 3 | | | | |
| | 2006 | Bizz DFPZ | | | | 70 | 130 | | 12 | 585 | 797 | | 457 | 558 | 1015 |
| | 2007 | Silver DFPZ | | | | | | | | | | 21 | | | 21 |
| | 2007 | Bailey | | | | | | 99 | | 36 | 135 | | 134 | | 134 |
| | 2007 | Betty Sue | | | | | 40 | | | | 40 | | 40 | | 40 |
| | 2008 | Betty Sue | | | | | | | | | | | | | |
| | 2009 | Robber's | 1093 | 33 | | 459 | | 12 | | 672 | 1176 | 87 | 209 | 828 | 1124 |
| | 2009 | Pegleg | | | | | | | | | | | 10 | | 10 |
| | 2010 | Silver DFPZ | | | | | | | | | | 21 | | | 21 |
| | 2010 | Robber's | 81 | | | | | | | 81 | 81 | | 81 | | 81 |

| | | | | | | | | | | | | | | | |
|--------------------------------------|------|----------------|------|------|-----|------|------|------|----|------|-------|------|------|------|-------|
| | 2011 | Bailey | 1 | | | | | | | 31 | 31 | | 31 | | 31 |
| | 2011 | Mdw enhance | 6 | | | 6 | | | | | 6 | | | 6 | 6 |
| | 2012 | Pegleg DFPZ | | 20 | | 47 | 26 | | | 3 | 96 | 77 | | 20 | 97 |
| | 2014 | Pegleg DFPZ | | 4 | | | | | | | 4 | 4 | | | 4 |
| | 2017 | Willow Springs | | | | | | | | | | 14 | | | 14 |
| Thinning for Hazardous Fuels | 2005 | Silver DFPZ | | | | | | | | | | 6 | | | 6 |
| Prescribed fire for Wildlife habitat | 2010 | Betty Sue | 463 | | | | | | | | | | | | |
| | 2011 | Betty Sue | 187 | | | | | | | | | | | | |
| Resource Improvements | | | | | | | | | | | | | | | |
| Soil Productivity | 2005 | Long DFPZ | | | | | | | | | | 21 | | | 21 |
| | 2008 | Pegleg | | | | | | | | | | 3 | | 4 | 7 |
| | 2009 | Bizz DFPZ | | | | 1 | | | | 3 | 4 | | 5 | | 5 |
| Riparian Improvements | 2005 | Pegleg | | | | | | | | | | | 5 | | 5 |
| Private Lands | | | | | | | | | | | | | | | |
| Commercial Thin | 2001 | NA | | | | | | | | | | 223 | | | 223 |
| Selection Cut | 2001 | NA | | | | | | | | | | 211 | | | 211 |
| | | | 7484 | 1186 | 532 | 3255 | 4754 | 2162 | 95 | 5481 | 17465 | 6464 | 7762 | 5839 | 20065 |

Table 2. Future Actions

| | | Subwatersheds | | | | | | | | Range Allotments | | | |
|-------------------------------|------------------------------|---------------|-----------------|--------------|------------------|-----------------|----------|--------|-------------------|------------------|---------------|-----------|----------------------|
| Treatment Type | Year signed | Barnes Flat | Robber's Spring | Swain Meadow | Tamarack Springs | Upper Dry Creek | Westwood | Unkown | All Subwatersheds | Clover Valley | Robbers Creek | Duck Lake | All Range Allotments |
| Clear Cut | 2007 2015 | 10 | | | | | | | 10 | 155 | | | 155 |
| Group Selection | 2007 2016 2018 2019 | | | | 6 | 3268 | 133 | 260 | 3667 | | 26 | 1564 | 1592 |
| Sanitation Salvage | 2015 | | | | | | | | 0 | 185 | | | 185 |
| Selection (uneven management) | 2015 | | 141 | | | | | | 141 | 762 | 141 | | 903 |
| Total | | 10 | 141 | | 6 | 3268 | 133 | 260 | 3818 | 1102 | 167 | 1564 | 2835 |

Table 3. Ongoing Actions

| Treatment Type | Year | Description |
|---|---------|---|
| Transportation | | |
| Road Maintenance | ongoing | Annual road maintenance, grading of roads and ditches, culvert clean out, hazard tree removal |
| Range | | |
| Cattle Grazing | ongoing | Seasonal cattle grazing within allotments |
| Recreation | | |
| General Recreation Use | ongoing | OHV use on forest roads; hunting; dispersed camping; driving for pleasure; sightseeing |
| Tree Cutting | | |
| Wood cutting and Christmas tree cutting | ongoing | Cutting dead trees for firewood. Cutting live tree for Christmas Trees |
| Hazard tree removal | ongoing | Along PG&E powerlines hazard trees may be removed by the company. |

Appendix D – Summary of Response to Comments

This document analyzes public comments received during the public comment period for the Robbers Creek Watershed Restoration Project Draft Environmental Assessment. The Draft EA was released to the public on January 6, 2021 and the comment period closed on February 4, 2021. This summary outlines the process that was used to analyze comments, potential issues, and alternatives that were suggested by the public for the Robbers Creek project.

Table 1 and 2 (below) contains a list of interested or affected individuals, groups, and other agencies to which the scoping announcement for the Robbers Creek project was sent. The announcement was sent to those who responded to the Lassen National Forest Schedule of Proposed Actions (SOPA), participated in pre-scoping collaboration, provided comments during scoping or who would otherwise be potentially affected. **Table 3** contains the list of those who responded during scoping and the comment period. One individual provided written comments during the provided scoping period and five individuals provided written comments during the comment period.

Table 1. Contact List for Public Scoping for the Robbers Creek Project.

| Individual Name | Organization | Individual Name | Organization |
|-------------------------------------|----------------------------------|------------------------------------|---|
| 1. Patricia Puterbaugh | Lassen Forest Preservation Group | 13. General mail box | Lassen Co. Board of Supervisors |
| 2. Ben Solvensky and Susan Britting | Sierra Forest Legacy | 14. General mail box | Collins Pine Company |
| 3. Chad Hanson | Sierra Forest Legacy | 15. General mail box | Fruit Growers Supply Company |
| 4. Greg Suba | California Native Plant Society | 16. Debra Hallis and Colt Brockman | Central Valley Water Quality Board |
| 5. Woody Elliott | Mount Lassen Chapter - CNPS | 17. Sherrie Thrall | Supervisor, District 3 County of Plumas |
| 6. Steve Buckley | Lassen Volcanic National Park | 18. General mail box | Lassen County Board of Supervisors |
| 7. Ryan Burnett | Point Blue Conservation Science | 19. Paul Moreno and Nicole Reese | PG&E |
| 8. Wally Roney | Roney Land and Cattle Co. | 20. Frank Stewart | County QLG Forester |
| 9. Dusty Debraga | Denny Land & Cattle Company, LLC | 21. Dav Weinman | Sierra Institute and distribution list for South Lassen Watershed Group |
| 10. Scott Stawiarski | AFRC Consultant | 22. General mail box | California Department of Transportation, District 2 |
| 11. Jake Blaufuss and John Ramaley | Sierra Pacific Industries | 23. Martin Ritchie | PSW Redding, Research Forester |
| 12. Ryan Hillburn | Beatty & Associates | 24. Scott Hill | California Dept. of Fish and Wildlife |

Table 2. Tribal Contact List for Public Scoping for the Robbers Creek Project

| Tribal Organization | Chairperson and cc's |
|--|--|
| 1. Susanville Indian Rancheria | Honorable Deana Bovee Chairwoman, Dr. Roselynn Lwenya, Melany Johnson THPO, Environmental Coordinator, |
| 2. Greenville Rancheria | 1. Honorable Kyle Self Chairman, Crystal Rios Tribal Vic Chairwoman, Lacy Miles NAGPRA Coordinator |
| 3. Maidu Summit Consortium & Conservancy | Honorable Ben Cunningham Chairman, Kenneth Holbrook Executive Director, Lorena Gorbet |
| 4. Maidu Cultural Preservation Association | Michon R. Eben, Thaddeus Cason |
| 5. Pit River Tribe | Natalie Forest-Perez THPO, Agnes Gonzalez, Anthony Quinn, Marissa Fierro, Charles White, Orvie Danzuka, Brandy McDaniels |
| 6. Redding Rancheria | 2. Jack Potter Jr, Melodie Honey |

Table 3. List of Respondents to Public Scoping for the Robbers Creek Project.

| Response received | Letter # | Agency, Organization, Business, or Individual | Date |
|-------------------------------|-----------------|---|-------------|
| Draft EA Comment Period | 1 | Patricia Puterbaugh, Lassen Forest Preservation Group | 02/01/2021 |
| | 2 | Scott Stawiarski, AFRC Consultant | 01/25/2021 |
| | 3 | Jake Blaufuss, Sierra Pacific Industries | 02/02/2021 |
| | 4 | Doug Kinkle, Recreational Aviation Foundation | 01/24/2021 |
| | 5 | Nan Cayler, private citizen | 01/07/2021 |

Table 4 identifies and documents specific statements from the letter received from the public in response to scoping. The Robbers Creek Project Responsible Official identified statements as comments, questions, requests for information, alternative suggestions, potential issues, and literature citations. The general topic of the statement was noted. The Responsible Official then provided rationale for determining the status of the comment and if any issues were identified and/or suggested alternatives carried forward. A copy of the comment letters are in the Robbers Creek planning record located at the Almanor Ranger District Office. No significant issues were identified from public comments.

No proposed alternatives from scoping were determined to warrant further detailed study.

Table 4. Summary of Letter Received during the Opportunity to Provide Public Comments

| Respondent: Patricia Puterbaugh – received 02/01/2021 | | | |
|---|----------------|---|--|
| Comment # | Identification | Summary of Comment | Responsible Official's Disposition |
| 1-1 | Question | How will you assure 40-50% canopy cover in the unit, or plan when this is a 10% variability factor for CC? | Canopy cover is correlated with basal area based on Forest Vegetation Simulator runs of the Robbers Creek stand exam data. Target basal areas would be assigned by unit in the marking guidelines and are designed to retain a minimum of 40 percent canopy cover averaged across the treatment unit in mixed conifer/white fir 4M, 4D and 5M upland forest stands. |
| 1-2 | Question | How will the post plan grazing effect this work? We support the plan for meadow enhancement and aspen regen, but not without livestock exclusion and clear plans for monitoring into the future. | Pg. 15 of Robbers Ea - Following restoration activities, livestock use would be minimized within the restoration area. A drift fence or other allotment adjustments (i.e. rest rotation or pass through) would be used to control timing, duration, and intensity of grazing to allow for the recovery of the riffle augmentation sites and vegetation regrowth of willows and other meadow vegetation. |
| 1-3 | Question | Dry Creek and Ginger Creek goshawk territories will experience a negative 4% in nesting habitat after the project. Dry Creek also has 30% private land in its territory. What about a strategy to bring these percentages up to 0% in our plan? Robbers Creek Territory will have a 3% decrease in nesting habitat and it has 22% of the territory in private lands. Are we able to tweak our prescriptions to have no decrease in nesting habitat? | See pgs. 46-48, 50-56 of Robbers Thinning treatments may result in short-term impacts to goshawk habitat suitability, balanced with the achievement of the desired results of improved forest health and resiliency within the project area. The reduction in nesting habitat is a result of treatments within aspen, meadow and riparian areas that fall within the territory. To meet the desired condition for aspen, meadow and riparian habitat |

| | | | <p>improvement canopy cover would be reduced to below what is considered suitable for goshawk. The reduction in nesting habitat in the Dry Creek Territory is a result of thinning within an 18-acre East Side Pine stand.</p> <p>Reducing canopy cover in an East Side Pine is ecologically appropriate and treatments are designed to reflect forested conditions under regular fire return intervals. Changes in nesting habitat do not exceed 18 acres in any of the three affected territories. These changes to nesting habitat are not extensive and do not pose a risk to the nesting success of goshawk as stated in the BE on pg. 50-56.</p> |
|---|-----------------------|--|--|
| Respondent: Scott Stawiarski – received 01/25/2021 | | | |
| Comment # | Identification | Summary of Comment | Responsible Official's Disposition |
| | Comment | Respondent recommended various <i>Timber Sale Design Features</i> to be considered post NEPA analysis during the implementation planning phase of the project. | Comments noted |
| Respondent: Jake Blaufuss – received 02/02/2021 | | | |
| Comment # | Identification | Summary of Comment | Responsible Official's Disposition |
| | Comment | Respondent requested consideration of the use of Designation by Prescription (DXP) for the majority of the stands. Where DXP is not appropriate, consider a leave tree mark. | Comment noted |
| | Comment | Please consider thinning across the diameter distribution with a focus on removal of any diameter tree within striking distance of the powerline. | The proposed action was modified to specify that "any tree within striking distance of the powerline, regardless of size, would be removed. |
| | Potential issue | Please consider the application of the borate compound only in and around campgrounds and adjacent to roads. | The Robbers Creek project area has light to moderate levels of Heterobasidion root disease. Borate treatment of stumps is recommended by FSH 3409.11 chapter 60 to prevent further spread of the root disease, |

| | | | |
|--|-------------------------|---|---|
| | | | especially with partial cutting practices such as those proposed for Robbers Creek. |
| | Request for information | In Table 16, pg. 47 it states that 4,000 acres of the project area are proposed for underburn treatment. Please state the timeline for achieving this objective. Also please include a table showing the priority of this prescribed burning project as it ranks to other prescribed fire projects on the ARD, not yet completed. | The timeline to complete all underburn operations could take 10 to 20 years or longer as needed. There is no ranking of prescribed fire projects on the Almanor Ranger District. The goal of the forest is to have prescribed fire projects that can be conducted throughout the year depending, in part, on resource availability, weather and smoke concerns. |
| | Request for information | Please provide the location of drafting locations and any restrictions associated with these locations. | Restrictions for the use of water drafting sites are described in the integrated design features Appendix B. Locations of water sources would be included on the timber sale or stewardship contract maps during the implementation phase. |
| | Comment | Please consider that the future use of routes (planned to be decommissioned) for operations will likely be necessary and impacts to the resource will lessened with a minimal treatment (blocking access). | Comment noted |
| Respondent: Doug Kinkle – received 01/24/2021 | | | |
| Comment # | Identification | Summary of Comment | Responsible Official's Disposition |
| | Comment | Respondent requests the forest service consider an action to restore the runway in Barnes Flat for its use as a back-country runway. | This action is outside the scope of the current proposal. |
| Respondent: Nan Cayler – received 01/07/2021 | | | |
| Comment # | Identification | Summary of Comment | Responsible Official's Disposition |
| | Question | Respondent asked if a walking path that ties into the Bizz Johnson Trail would be part of the project. | This action is outside the scope of the current proposal. |